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Social Mobility and Educational Inequality in England: A Regional Breakdown

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Abstract: The UK has one of the lowest rates of social mobility in the developed world. While ample research has been published on the stratification of British society resulting from this, far less UK-specific work looks to unpack the processes which ensure these divides persist. This study reviews wider social mobility literature to demonstrate how inequality of opportunity in human capital development could be the dominant causal factor in low mobility, before investigating instances of this in England specifically. This is achieved via a regional analysis of educational inequality, whereby differences in pupil attainment within and between 300+ Local Authority Districts are examined. It is revealed that London has very high opportunity for all children, whereas elsewhere in the country only wealthy children perform well. There is also evidence of an urban/suburban divide and a north/south divide in educational opportunity, as well as significant relationships between opportunity and socio-economic variables. This detailed regional picture can be used to guide further research, and to make inferences about low mobility in the UK.

Key words: Social mobility, educational inequality, meritocracy

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Scott

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1.0 - Introduction

"The world needs people like Americans, because you're dreamers, aren't you (...) you're an American dreamer dreaming the American Dream. We don't have a dream in Great Britain – we don't. There is no 'British Dream'. This isn't because we lack some sort of sense of moral purpose, this isn't because we haven't got a sense of guiding destiny taking us towards a better tomorrow, no. We don't have a dream in this country because we're awake"

Comedian Al Murray (2012)

The UK and the US are two countries with a lot in common. A shared history, shared language, and great deal of cultural exchange see the two cooperate and mirror each other in a range of social, economic and political spheres. One aspect of this, and an aspect not often highlighted, is that both these Anglophone nation-states exhibit some of the lowest rates of social mobility in the developed world (d'Addio, 2007). While this may not come as a surprise to an economist or social scientist, the similarity is striking when one considers the public perceptions of mobility on either side of the Atlantic. One of the most treasured American archetypes is the 'go-getter'; the underdog rising from unassuming circumstances and living the 'American Dream'. Anyone can succeed in the 'Land of Opportunity' – the American Dream itself has been defined as the 'prospect of upward mobility' by members of the public in a survey by the Economic Mobility Project (2009).

Britain does not share this unbridled optimism. Fixed social strata have been embedded into the national consciousness, and are routinely evidenced by anecdotal and empirical works. A 2011 poll from AP-CNBC found 21% of Americans are confident of becoming millionaires, compared to 8% of UK citizens. A quick search of the BBC website will return results including 'Does a narrow social elite run the country?' (2011a), 'Five schools 'send more to Oxbridge than 2000 others'' (2011b), and 'Why does PPE rule Britain?' (In reference to the politics, philosophy and economics course at The University of Oxford (2010)). Vast amounts of UK television trade off the class divide, from Downtown Abbey to Blackadder, and comedians are able to form their entire persona around the class tensions in British society (see Mickey Flanagan, Lee Mack, Miles Jupp etc.). A 'Great British Class Calculator' was recently released based on research from Savage, et al. (2013), and Bennett, et al. thoroughly investigated the cultural components of British class in their 2009 book 'Class, Culture, Distinction'. While this miscellany of sources is a crude berometer of the national psyche, it serves as an interesting

starting point for this discussion: Britain appears resisgned to low social mobility, and there are not constant pushes to improve opportunity in a way comparable to those in the United States. Symptomatic of this is the situation in academia, whereby we have a deep understanding of the class differences in the UK, but a suprisingly makeshift framework through which we understand their persitence. This study looks to explore the latter by drawing on interdisciplinary literature, and by considering the crucial role of education in intergenerational mobility. Specifically, it concerns the link between unequal opportunities for children and low social mobility, and looks to investigate the educational component of this on a regional scale. The aims of the study, therefore, can be summised as follows:

- To explore the geography and the determinants of educational inequality in England[1]
- To consider the implications of this for social mobility policy

The following chapters look to expand upon and develop these aims into a feasible analysis, and a technical research question is presented at the end of the methodology. While the context, mitigation, and nomenclature for this operationalised research question are all forthcoming, an abridged version has been included here for structural clarity:

How did 2014-15 school attainment vary within and between regions in England, and to what extent are these differences correlated with the socio-economic and infrastructure profiles of said regions?

The framework and process via which this research question will be answered is outlined in the following subsection, before the thesis proper begins on page 8.

1.1 - Thesis Outline

[1] The entirety of the UK could not be investigated due to data constraints. The results may tentatively be extrapolated to Scotland, Wales, and Northern Ireland, but the level of devolution in the educational infrastructure, as well as other national nuances, should be taken into account.

The opening ‘Social Mobility’ chapter considers a broad literature to help frame the analysis. It is demonstrated that mobility is difficult to define, but best measured in economic terms, commonly using income elasticities as a metric. The UK is revealed as performing extremely poorly against this measure on several international comparisons, most notably so against European countries with a similar population size. To investigate the reasons for this, the mechanisms of social mobility are considered using a theoretical framework from Miles Corak. The ‘Social Mobility’ section concludes with the relationship between equality of educational opportunity and social mobility being seen as crucial, and focuses the study on how educational outcomes vary intra-nationally.

In the ‘Educational Inequality’ chapter, more specific literature on education is considered to inform the analysis of educational outcomes. This section takes a similar structure to the first; first defining educational inequality, then considering the case of the UK and England specifically, and finally exploring the mechanisms of educational inequality. In this latter subsection, mechanisms are presented one by one alongside previous research, and this provides justification for their later inclusion as factor variables in the correlative analysis. The section shows how the quality of schooling needs to be standardised across socio-economic groups and across regions for maximum mobility, and highlights the ways in which parental income can bolster a pupil’s human capital development outside of school. The educational inequality chapter concludes by linking the construction of both dependent and independent variables to previous research, and by offering a brief precis of the proceeding methodology.

The ‘Methodology’ chapter takes the factors from previous research and develops them into variables using data from the UK government’s own ‘Social Mobility Index’. Educational inequality within and between regions are taken as the dependent variables, with several infrastructure and socio-economic independent variables taken as potential correlates. The two inequality measures are mapped using GIS, revealing regional patterns of educational inequality, and the socioeconomic profile of the more and less equal areas is investigated using scatter plots and descriptive statistics.

Several significant relationships are found, and these are described alongside the maps in the ‘Results’ chapter. This is subdivided into the results of the analyses between regions, the results of the analyses within regions, and the results of the analyses which consider how the two relate. The results are then cross-referenced with each other and wider research in the final ‘Discussion

and Conclusion' chapter, and the implications for academia and policy are considered. The study closes with a summary, and with a detailed picture of educational inequality in England.

2.0 - Social Mobility

2.1 - Defining Social Mobility

Before framing an analysis on the topic of social mobility, it is crucial to delineate the parameters of the term, as the phrase has been conflated with multiple phenomena in the past. There is no correct or doctrinal definition that can be simply offered up for clarity, so a brief consideration of what an appropriate conceptualisation might entail is required.

The broadest possible definition would include a holistic approach to the concept of 'social status', and mobility would represent status increasing or decreasing over time or over generations. Some sociological work uses a Bourdieusian framework of social, economic and cultural capital to attempt this, most notably Bennett, et al. (2009) and Savage, et al. (2013) in Britain, and they find different hobbies and interests, social cues and all manner of behavioural practices to play a role in someone's perceived 'class'. This presents a wealth of methodological issues for those in the discipline of economics, and, as such, the concept tends to be reduced to a purely monetary question in the more quantitative analyses. Here, this approach is taken, and mobility is viewed through the prism of living standards rather than tastes. There are still definitional nuances to consider, however, as economic mobility can also represent a range of processes.

Firstly, there is one attribution of the term which is fairly synonymous with economic growth. Sometimes referred to as 'absolute social mobility', this definition categorises any improvement in intergenerational living standards as 'social mobility' (The PEW Charitable Trusts, 2012). With this framework, 3 generations of factory workers could be said to be experiencing 'upward mobility', provided their household consumption rose over the decades. While changes in this metric are valuable for myriad analyses, this will not be the conceptualisation used here. It should also be noted that even the term 'absolute social mobility' is contested, with Chetty, Hendren, Kline and Saez using a different approach in their mobility work (2014, p. 1556).

Instead, this paper considers 'relative social mobility' to be a more relevant definition. This can be broadly described as rank movements up and down the income distribution relative to the

rank position of the previous generation. With this approach, income is only considered within the context of the current cohort, so three generations of factory workers would experience low mobility. Furthermore, if the grandson[2] of a doctor became a factory worker, this would be considered downward mobility due to their lower relative position in their cohort's income distribution, even if their absolute living standard was higher.

The justification for this decision is twofold. Firstly, the 'relative' mobility approach (subjectively) better encapsulates the 'American Dream' notion of 'rising up' and succeeding in the individual, Maslowian sense. Including incremental gains in living standards through macroeconomic growth can confuse the scale of some analyses, as well as disguising some of the most pertinent motivators of mobility research such as the rate of intergenerational poverty. Secondly, this paper is not only concerned with social justice and equality of opportunity. 'Meritocracy' is a related concept, which can broadly be defined as 'a system in which reward is based on merit, rather than non-aptitude variables (cronyism, nepotism, aristocracy, discrimination etc.)'. A more meritocratic society, often touted as the ideal (but not always, see Young, 1958), places the most able in the most important positions regardless of their background. This, in theory, has productivity benefits as the labour market would be perfectly matched / sorted to employees' capabilities. While this is incredibly difficult to investigate, the logic underpinning it has influenced arguments around equality of access in several different spheres – one notable case is the example of The University of Texas at Austin, which deliberately skews admissions in favour of the working classes as to not miss out on naturally gifted students (The University of Texas at Austin, 2014). Promoting meritocracy and improving labour market matching in this way is a key economic motivator for better social mobility policy, and the skill level of the labour force could potentially rise if every individual is able to maximise their potential in an equal system.

High relative mobility is implied in a meritocratic society and vice versa - irrational influences such as social networks and birth status become increasingly redundant. High relative mobility, therefore, promotes a utilitarian division of labour while simultaneously presenting families with routes out of (relative) poverty. For these reasons, relative mobility will be the incarnation

[2] In most social mobility analyses, only the father and son are considered. This is due to data availability and the confounding influence of changing female labour force participation (Corak, 2013, p. 4).

of social mobility considered here (social mobility, relative mobility and simply 'mobility' will be treated as interchangeable from hereon in).

2.2 - Measuring Mobility: Intergenerational Income Elasticity

The predominantly favoured statistic for measuring social mobility is 'intergenerational income (or earnings) elasticity'. This measure looks at the extent to which fathers' and sons' earnings are correlated, and fits into a model of adult earnings as illustrated by equation 0.

$$LnY_{i,t} = \alpha + \beta lnY_{i,t-1} + \varepsilon_i \quad (0)$$

Here, adult earnings (Y) for a generation t individual in family i are comprised of the average wage for the cohort (α), some coefficient (β) of the parent's earnings, and a range of non-inherited factors (ε). β represents the 'stickiness' of parental status across these generations, and is the value of intergenerational elasticity (Corak, 2013, p. 4). The statistic is a useful one, provided one is careful in its citation – it shows the degree of 'shuffling' in the income distribution across generations, and hence represents the importance of parental influences in determining adult income, or the 'degree of relative mobility'. It does not, however, wholly represent living standards, as inherited wealth (or crucially, property) is not accounted for. It also cannot accurately represent the rate of intergenerational relative poverty alone, as differences in the β value between countries may be due to differences in downward mobility from the top, rather than upward mobility from the bottom (Jäntti , et al., 2006, p. 27). A lower β is generally considered preferable, however, as it broadly implies either dissolving intergenerational dynasties, high levels of opportunity for the poor, or some combination of the two – the differences between countries are usually found to be rooted at the tail ends of the income distribution when the β value is broken down into a 'transition matrix'[3] (Corak, 2015, p. 3). For these reasons, it is perhaps best used as a meta-statistic for social justice in the income distribution, and as a reasonable proxy for meritocracy in recruitment practices (discussed

[3] Transition matrices show the chances children from each income quintile or decile have of finishing their life in every other quintile or decile. A typical finding would be that children from the bottom quintile only have a 7% chance of rising to the top quintile, whereas ideally it would be close to 20%.

further below). In any case, it is the favoured statistic of both academics and policymakers, and will be treated as broadly indicative of social mobility in this paper.

2.3 - Mobility in England

Various attempts have been made to estimate the value of this indicator between countries, and the results of these studies have not differed greatly from those in figure 1. Typically, the Scandinavian countries are found to be the most mobile, with elasticities of 10-30%. The USA, UK and Italy are regularly found to be among the least mobile, with higher rates of 40-70% depending on the study / exact measure used. These differences are often attributed to the large, diverse populations[4] and unequal access to goods and services in the more neoliberal countries, with Scandinavia lauded for its generous public sector and social support systems. This attribution is often an assumption, however, and a more considered, empirical approach is required to explain the different national rates.

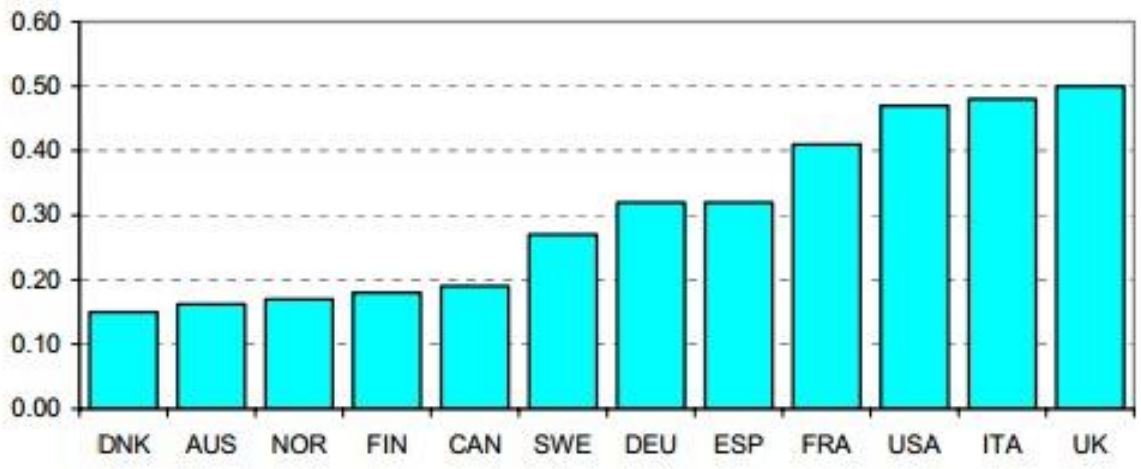


Figure 1: Intergenerational Earnings Elasticity estimates. Source: Meta-analysis by d'Addio (2007)

2.4 - Mechanisms of Mobility

[4] Population size is one confounding factor which is not often explicitly considered in mobility literature, although it does seem to correlate with mobility at a glance. This will not be considered in detail here, as the UK has worse mobility than even larger countries such as the USA. Additionally, Germany, Spain and France are all of a comparable size to the UK and exhibit higher rates.

The β value is a descriptive statistic, and hence reveals little about the underlying drivers of mobility. For those wishing to improve rates, this makes formulating policy both a challenge and a danger – legislature intended to reduce inequalities may actually increase them if the processes of mobility are not carefully considered (Becker, Kominers, Murphy & Spenkuch, 2015). This is a point cogently made by Milton Friedman (YouTube, 2013), who demonstrates how having free tertiary tuition in the USA would effectively tax the poor for the benefit of the wealthy if high school results (and hence, university admissions) still favoured the upper middle class. Rather than improving access, this could result in increasing inequality. The forces underlying (im)mobility, therefore, must be thoroughly investigated before policy recommendations can be made. This subsection addresses these mechanisms.

The theories of intergenerational persistence have a long, interdisciplinary history with notable contributions from sociology (for example, Bourdieu, 1986; 1996) as well as economics (for example, Becker & Tomes, 1979; 1986). Recently, there has been a resurgance of interest on the economics side, owing in part to Alan Krueger referencing the low US mobility in a 2012 speech; he made several striking claims which were amplified by the press, such as claiming economic status is equally as inheretable as height. This both triggered new and reignited old debates, and the resurgance has been fruitful - some of the most holistic and innovative approaches to understanding mobilty have come from contemporary contributors. Miles Corak and Raj Chetty are two of the most eminent authors on this topic (see, for example, Corak, 2013; 2015; Chetty et al., 2014), and their work is reviewed in this section. The aesthetic and pragmatic approach taken by Chetty et al. is considered first, where GIS mapping has been persuasively used to show life chances around the US. This is followed by a deeper analysis of Corak's theoretical work, which looks to unpack more and less mobile regions.

2.4.1 - Chetty, et al. – Mapping mobility

'Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States' is the title of Raj Chetty and co-authors' most impactful work on social mobility. The outputs of the study are varied, but perhaps the most cited are the GIS produced maps of absolute and relative mobility in the United States. Tracking income elasticity of individuals from 'commuter zones', the study is able to show how income elasticity varies region, and some broad patterns emerge. Rural areas and the liberal North East have medium to high mobility, with rates comparable to several European countries, whereas the South East and Florida have

far less mobility, and few instances of 'The American Dream'. To explain these patterns, a move is made to correlate the regional rates with potential mechanisms:

"We consider covariates in 10 broad categories: racial demographics, segregation, properties of the income distribution, K–12 education, social capital, family structure, local tax policies, college education, labor market conditions, and migration rates."

Chetty, et al., 2014, p. 1604

Of these, it is concluded that:

"The spatial variation in intergenerational mobility is strongly correlated with five factors: residential segregation, income inequality, school quality, social capital, and family structure."
p. 1620

The study is tremendously insightful, and appears to show both residential and infrastructure variables correlating with mobility. Unfortunately, there is not comparable data to replicate this methodology in the United Kingdom (Social Mobility and Child Poverty Commission, 2016b). The structure of Chetty, et al.'s work, however, will be used to inform this analysis.

2.4.2 - Corak - Theoretical Underpinnings

In addition to the perturbing central thrust of Krueger's speech, several intricate points were made about low mobility. The take-home message for policymakers was that mobility and income inequality are steeply correlated, and that worsening income inequality may well hamper 'The American Dream' further. While this latter point has been disputed since, there are few quarrels remaining with the existence of this correlation, popularly referred to as 'The Great Gatsby Curve' (figure 2).

Figure 2 – 'The Great Gatsby Curve'. Source: Corak (2013)

Evident from the chart is that the UK, once again, has among the highest immobility in the developed world. More striking, however, is the apparent link between the Gini coefficient of countries and their β value. There is a strong negative correlation between income inequality and social mobility, depicted here as a positive slope concerning immobility. This suggests relative mobility is strongly linked to the level of inequality in a country, and Corak offers some insights as to why this might be. The concept of 'equality of opportunity' represents an overarch in his work, and is introduced here by way of a quote from Brunori, Ferreira and Peragine (2013):

"[In]equality of opportunity is the missing link between the concepts of income inequality and social mobility; if higher inequality makes intergenerational mobility more difficult, it is likely because opportunities for economic advancement are more unequally distributed among children."

p. 17

This concept is elaborated upon further in Corak (2015) with input from Roemer and Trannoy (2015). To synthesise, children should be given an equal opportunity to start out in life regardless of the circumstances in which they were born. This will allow the most able children to rise to the top of the educational hierarchy (meritocracy) as well as breaking down intergenerational poverty and dynasties. It is argued that inequality of *income* is not necessarily the direct causal mechanism of low mobility, and that if equality of *opportunity* could be

achieved then the mobility limitations of inequality could be ameliorated (Income inequality correlates as it both increases the capacity of parents to make opportunity investments, and increases the incentives to do so). This would involve compensating children for the 'birth lottery', so their individual capabilities could shine through regardless of background. A framework for achieving this is presented in Corak (2015) [5]:

$$lnY_t = \phi lnY_{t-1} + \gamma H_t + \lambda E_{t,c} + \nu_t \quad (1)$$

$$H_t = E_{t,b} + \theta lnY_{t-1} \quad (2)$$

$$E_{t,a} = \alpha + hE_{t-1,a} + \nu_t \quad (3)$$

In this framework, an individual's adult earnings (lnY_t) can be predicted by the earnings of their parents (lnY_{t-1}), their productive human capital (H_t), their non-productive characteristics (E_t), and by a residual referred to as 'luck' (equation one). Minus the residual, each of these factors has a coefficient, which can be thought of as representing: the influence of direct financial nepotism on the labour market (ϕ), the influence of rational hiring practice on the labour market (γ), and the influence of irrational hiring practice on the labour market (λ). Equation two concerns the formation of human capital, which is impacted by individual characteristics and, to some (θ) extent, parental income. Equation three shows how individual characteristics are comprised of an average 'cultural endowment' of the cohort, some inherited endowments (both biological and cultural) of importance 'h', and a second luck residual.

[5] The 'characteristics' variable 'E' is not clearly defined in literature. Here, we take it to represent slightly different things in each equation. In equation 3, E represents all the characteristics of an individual (denoted by subscript 'a'. In equation 2, E represents only the *productive* characteristics of an individual (i.e. those which are beneficial to human capital development), denoted by subscript 'b'. In equation 1, E represents only the *non-productive* characteristics of an individual (i.e. those which should play no part in the hiring process), denoted by subscript 'c'. $E_b+E_c=E_a$

While this model is reductionist and operates at an extreme level of abstraction, it can be useful for considering the mechanisms of inheritance. There are three kinds of inheritance elasticity highlighted which may affect adult earnings. First is direct financial nepotism in the labour market (ϕ), second is the impact of parental earnings on human capital development (θ), and third is the importance of genetic and cultural inheritance in forming an individual's character (h).

Regarding the first, Corak argues that 'most citizens' would like to see nepotism minimised, as well as the importance of non-productive characteristics in the hiring process (skin colour, accent etc.). This is also desirable in a rational economic system, so we take a high value of γ and low values of ϕ and λ to be 'ideal', both in a meritocracy and in a socially just society. As, in this scenario, productivity would be the sole determinant of income, human capital formation becomes incredibly important:

$$lnY_t \approx (E_{t,b} + \theta lnY_{t-1}) + v_t \quad (4)$$

The elasticity θ represents, as aforementioned, the importance of parental earnings in human capital formation. If the hiring process is rational, then this elasticity having a high or low value symbolises the difference between a mobile, Scandinavian-style meritocracy with fair competition in each generation (low value), and one where there is no mobility, and birth status determines a great deal via access to training[6]. There is some evidence that the UK is already fairly meritocratic *after* education, at least to the extent that education acts as a good prediction of future earnings (Corak, 2013, p. 10). Rather than being 'dystopian', therefore, the θ value may already be one of the prominent mechanisms behind immobility. In other words, inequality of access to education by parental income may be damaging mobility in the UK. A range of statistics published by organisations such as The Sutton Trust support this assertion, with those attending fee-paying schools significantly overrepresented at the top universities in the country.

An ideal study using Corak's approach (which itself is based upon models by Gary Becker and Nigel Tomes), would be able to explore the relative influences of nepotism, discrimination and productive human capital on wages, before breaking down human capital into its constituent

[6] There are also elasticities contained within the E value (see equation three) but it has been proposed that these are beyond the reach of policy, as attempting to control for the 'genetic and cultural endowments' an individual receives would significantly intrude upon family autonomy (Corak, 2015).

factors and revealing the cumulative impact of parental influence. The concepts of nepotism and discrimination are difficult to measure, however, and there is no way to account for the significance of the 'luck' residual. Rather than viewing this as a limitation, however, it focuses the study on educational inequality – the factor that appears to be the most significant driver of immobility in literature. It is also possible to argue, theoretically and hypothetically, that if educational inequality was reduced to zero then any remaining intergenerational 'stickiness' would be attributable to nepotism, discrimination, or biology (within the constraints of Corak's reductionist model).

The theoretical work of Corak, therefore, argues low social mobility is attributable to inequality of opportunity, and that the drivers of this are various forms of inherited status or opportunity. The aspects of this which are of interest, and can morally be targeted with policy, are nepotism, discrimination and educational inequality. Controlling the impact of nepotism and discrimination is desirable on almost all fronts, although this cannot be measured. Educational inequality, however, seems to be the dominant factor in low mobility, and an analysis of this variable is realistic and achievable. In addition, it is the only variable which 'justifies' low mobility on productivity grounds, so reducing it may be the key to improving mobility more generally.

2.4.3 - Combining Chetty and Corak

This interpretation of Corak's work suggests focusing on educational equality is a reasonable way to begin a policy discussion on improving mobility in the UK. This study takes an approach based on the 'equality of opportunity' principle, and looks to outline the ways in which children have unequal educational opportunities in England specifically. Investigating, describing and analysing the geography and economics of these unequal opportunities will shed light on where in the country low mobility is generated, as well as help to guide educational and mobility investment in the future. The aims of the study are heavily influenced by this mode of thinking, and, as such, will be reiterated here:

- To explore the geography and the determinants of educational inequality in England
- To consider the implications of this for social mobility policy

Given that Chetty et al.'s more direct analysis of mobility cannot be replicated, a strong substitute is to use a similar approach to investigate educational mobility. The structure of Chetty et al.'s work is broadly mirrored here; a regional analysis of educational inequality in

England is performed, followed by a correlative analysis of influential factors. This will reveal the geography and determinants of equality of opportunity in England, and the results can be used to make inferences about social mobility given the crucial role education plays.

Given that this study does not deal with mobility directly, a more detailed discussion of educational inequality is necessary. The following section reviews interdisciplinary literature on this topic, relates education back to mobility, and begins to frame the analysis.

3.0 - Educational Inequality

The above sections have outlined the ways in which educational inequality may be responsible for low mobility in England. Even if the labour market was rational and uninfluenced by nepotism or discrimination, the capacity of parents to influence their children's human capital development would severely inhibit mobility. This study focuses on where in the country this has been the case, and what specific processes of advantage and disadvantage are causing human capital to be transmitted.

To investigate this issue comprehensively, a more detailed look at the literature *specifically* on educational inequality is required. This section mirrors the previous one; first it considers what an appropriate definition of educational inequality might entail, before looking at the case of England specifically, and finally reviewing literature concerning the mechanisms behind the phenomenon.

3.1 - Defining Educational Inequality

There are, of course, different ways of conceptualising educational inequality. There are debates around inequality of access versus inequality of outcome, around which measurements of access and outcome to use, and around what constitutes an unfair disadvantage. Here, an 'equality of opportunity' approach is taken, inspired by the logic of the meritocracy and by the philosophical work of Roemer and Trannoy (2015). This framework posits that individuals are born into certain circumstances as a result of luck, and hence should only be judged against others with an equally lucky endowment. To improve mobility in a fair and moral way, it is suggested that individuals should be compensated for their 'birth lottery' and then judged on how they perform on a level playing field. There are some nuances to this argument which will not be elaborated on here, such as whether natural intelligence is 'lucky', but a simple way to interpret the position is that all children should have identical opportunities to develop their

human capital. In this scenario, mobility would be very high, as the only relationship between the success of the parent and the success of the child would be biological.

If this was the case, and access to education was completely fair around the country, then we would expect to see some trends reflecting this. Differences in attainment between schools / between regions would be small, as the dominant variable influencing attainment would be biology. There would still be a bell curve of ability within each school, but it would not be so steeply correlated with socioeconomic variables as, again, the biology and character of the children would be the only advantage or disadvantage one has over the other. This is illustrated by Goldthorpe (2003) in Figure 3, which depicts a vanishing association between class origin and class destination, a weakening association between class origin and educational attainment, and a strengthening link between attainment and class destination. Research throughout the book 'Too Many Children Left Behind' by Bradbury, Corak, Waldfogel and Washbrook (2015) shows socioeconomic status is a good predictor of child success in academia in the USA, and similar results have been found in the UK by authors such as Feinstein (2003) – both sets of findings support the assertion that attainment in these countries is unreflective of the natural abilities of the youth.

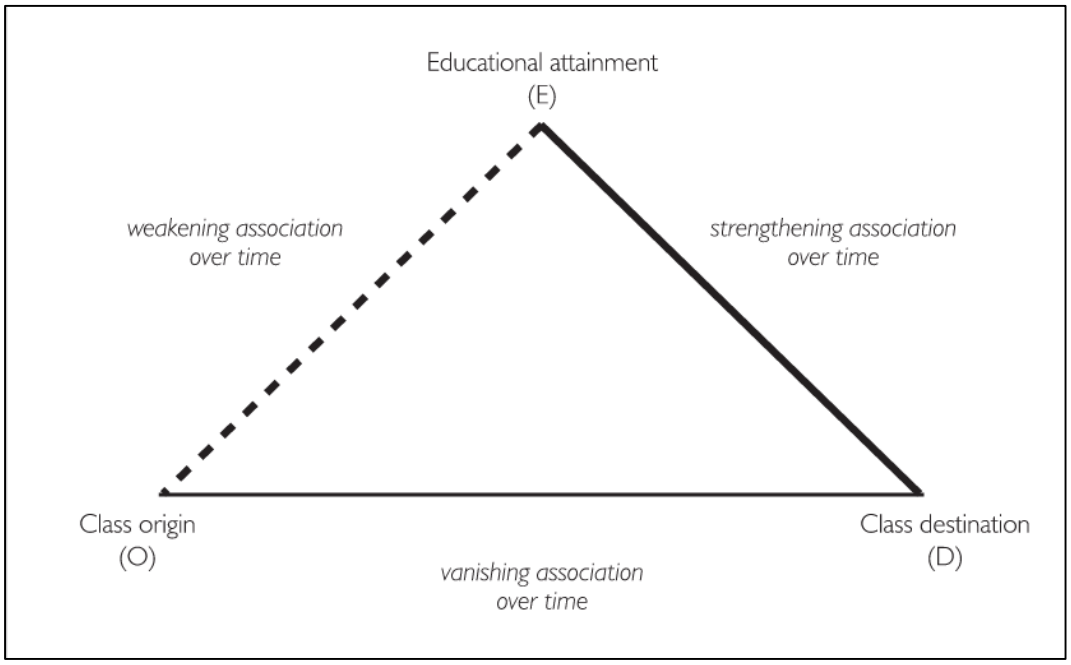


Figure 3: 'The Theory of Education-based Meritocracy.' Source: Goldthorpe, 2003

It is important to note that even in a utopic scenario, where opportunity was equal for every child, there may still be some small elasticities with parental status. If one of the components

of a parent's success was their favourable genetic makeup, and these advantageous genes are transmitted to the child, then there would perhaps still be some link between parental income and educational attainment. This is explored tentatively by Becker, et al. (2015), who suggest assortative mating could reduce mobility in the long run, and is taken to an extreme by Clark and Cummins (2016), who conclude from their 'surname analysis' that genetics play such a dominant role in child success that mobility policy is useless. They state: *'aspirations that by appropriate social design rates of social mobility can be substantially increased will prove futile. We have to be resigned to living in a world where social outcomes are substantially determined at birth'* (p. 23-24). This position, which implies no difference in mobility rates between countries, is inconsistent with the majority of work in the field and is pre-publication at this stage. It does, however, help to highlight the importance of biology in social mobility. More research will be required by biologists and social scientists alike to ascertain whether or not there is a 'true biological value' of status elasticity, so this paper simply acknowledges that it may be greater than zero.[7]

Educational inequality, therefore, is conceptualised here as different children having different opportunities to develop their human capital. High correlations or obvious patterns between attainment and non-aptitude variables are clear indicators of high educational inequality. Given that England does not demonstrate equality of opportunity in education, the location and the nature of the inequalities will be the focus of this paper.

3.2 - Educational Inequality in England

While circumstantial evidence has been provided thus far on the existence of educational inequality in England, direct evidence will briefly be presented here before the mechanisms are considered. Arguably the most striking piece of research looking directly at this phenomenon comes from Schütz, Ursprung and Woessmann (2005), who rank England as the worst country for educational inequality of the 54 they investigated using an index of 'family-background effects'. The study appears consistent with the wider social mobility literature despite using a

[7] This does imply that it is possible to mistake biological processes for social ones, and that policies designed with meritocracy in mind could 'overcompensate the less able', but this is a consideration for the distant future given the low rates of mobility in the UK today. The huge differences between the UK and Denmark (using mainstream measures such as income elasticity), for example, seem very unlikely to have solely biological explanations.

novel methodology, ranking the Scandinavian countries favourably at 43rd, 39th, 37th, 23rd and 20th, and many of the Anglophone countries nearer or within the top 20 for inequality.

While not many studies of this kind have been attempted, simple descriptive evidence strongly supports the assertion that England has low levels of equality of opportunity in education[8]. In the sparsely populated county of Devon, for example, there are 11 schools where over 70% of students achieved 5 or more A* to C grades at GCSE, and 9 schools where under 50% of students reached the same threshold. There is also one independent school where 100% of pupils reached this level, and one 'sponsor led academy school' where only 33% of students were able to (Department for Education, 2016). These discrepancies highlight that large differences exist even *within* regions – a concept which is expanded on further below.

Differences *between* regions have also been made very clear by the recently published 'Social Mobility Index' from the Social Mobility and Child Poverty Commission (2016a). This study found Greater London, Lancashire and South Birmingham had among the best educational infrastructure for mobility, with rural areas and the midlands being some of the worst performing. This study conflated some potential causal factors (such as school quality) with outcome variables (such as attainment) in an index, and can only present a broad picture of education in the UK, however. It does, as mentioned, clearly illuminate the need for a regional analysis considering the national nuances however – as with Chetty et al.'s research, it seemed that some areas of the country significantly outperform others, and that low educational mobility may not be ubiquitous.

While further examples could be given of the observable inequality, much of the prior research is combined with causal or correlative work looking to expand upon the reasons such gaps exist. With this in mind, this study considers the phenomenon as a whole to be apparent, and the remainder of this section will primarily concern itself with this prior research.

3.3 - Mechanisms of Educational Inequality

Social mobility, as aforementioned, is likely limited by having high levels of educational inequality. The mechanisms and processes underpinning unequal access to education, therefore, also underpin intergenerational persistence and distance the country further from the

[8] For a description of the education system in England, see appendix A

meritocratic ideal. There is not one clear cause of varying attainment, and so a nuanced consideration of the different factors influencing child development is required if mobility policy is to be targeted effectively. This subsection takes these factors briefly in turn, and outlines a framework through which they can be incorporated into an analysis.

Firstly, unequal access to schooling is an obvious mechanism through which different attainment levels may arise. If one school is able to invest more in their students, be it through learning materials, contact hours, higher quality teaching, or through some other process, then students of equal natural ability at a less fortunate school would fall behind. There are certainly large discrepancies in the resources schools have at their disposal – the government's own report on funding begins by stating 'There is widespread recognition that the current schools funding system is unfair and out of date' (Department for Education, 2014), and independent schools routinely charge massive premiums to provide top quality education. While independent schools represent a direct mechanism through which parental status can be converted into better access to schooling, free-to-attend grammar schools are often found to also be disproportionately recruiting from middle- and upper-class families, as these families are better equipped to prepare their children for entrance exams (Cribb, et al., 2013; Bolton, 2013; Skipp & Sadro, 2013). In addition to this social segregation factor, The Sutton Trust (2009) finds that comparable students from different school types perform differently in assessments:

'Pupils eligible for Free School Meals (FSM) at some point in their schooling in the most deprived 10% of schools on average achieve two grades less in their best eight GCSEs than FSM pupils in the most advantaged 10% of schools, after individual factors (ethnicity, social background, prior attainment) of pupils are taken into account.'

(p. 5)

The same study also finds that school quality influences the grade of students from non-deprived backgrounds, as well as students who are in the top 10% of attainment. School quality, therefore, will be considered in this analysis as a potentially important factor.

Secondly, and on a related note, the differing quality of preschools around the country may affect the cognitive development of children via similar mechanisms. Again, if the quality of one preschool is below that of another, then an equally talented child would be unlikely to attain the same academic results if everything else was held constant. This again can be transmitted

through wealth if better preschools are entitled to charge more for their services, or simply happen to be located in wealthier regions with disproportionate access to a certain demographic. Making the quality of preschools potentially more significant, however, is the foundational nature of preparatory education. If the basic competencies taught in nursery schools and kindergartens are not homogenised around the country, then this may be the start of inequalities that later become difficult to remediate. This point is emphasised in some related literature, with Knudsen, Heckman, Cameron and Shonkoff (2006) noting in their cross-disciplinary work that:

1. *Early learning confers value on acquired skills, which leads to self-reinforcing motivation to learn more*
2. *Early mastery of a range of cognitive, social and emotional competencies makes learning at later ages more efficient and therefore easier and more likely to continue*

(p. 5)

These specific points complement a wider argument that early development is crucial to a child's success in life; a point made perhaps most emphatically by Shonkoff & Phillips (2000), who state:

'Virtually every aspect of early human development, from the brain's evolving circuitry to the child's capacity for empathy, is affected by the environments and experiences that are encountered in a cumulative fashion, beginning in the prenatal period and extending throughout the early childhood years.'

(p. 6)

As a result of the particular weight this is given in the literature, nursery school quality will be considered alongside school quality in an attempt to present a holistic picture of educational infrastructure.

Thirdly, and finally, experiences children have outside of school may also play a significant role in their development. The education level of parents, the amount of time they are able to spend with their children, the level of disposable income they have to make extra-curricular investments, and a range of other factors could be influencing grades. Voluminous UK-specific research on this issue has been commissioned by The Sutton Trust, and some of their more recent studies have shown links between higher parental salaries and extra-curricular involvement (2014), higher parental status and career-beneficial 'soft-skills' (including attributes such as extroversion and confidence, which may come under $\lambda E_{t,c}$ in Corak's model

(de Vries & Rentfrow, 2016)), and several differences between 'bright but disadvantaged' students and their advantaged counterparts (Sammons, Toth & Sylva, 2015). With this in mind, a range of socioeconomic indicators will be included in the analysis as potential correlates to the attainment gap.

These non-aptitude variables will be considered as factors which could be influencing the educational inequality in the UK[9]. In order for the analysis to take shape, however, a measure of educational inequality is required as a dependent variable. As the Social Mobility Index indicates, the scale of this measure is significant, as there may be differences both within and between regions. This study, therefore, takes two measures of inequality of opportunity at the regional level, to more thoroughly unpack the nature of educational inequality in England. The first measure looks at inequality within regions, as exemplified by Devon, to show whether a county or constituency is internally meritocratic. The second measure looks at the average student grade for each region, highlighting the national trends in attainment and major regional differences. Each dependent variable is mapped, and then correlated against the independent variables in turn. There is also a correlation between the two dependent variables, to see if regions make an 'equality-quality trade-off' (this was found to not be necessary by Schütz, Ursprung & Woessmann (2005) on the international scale, but may be the case locally). The next section elaborates on these methodologies, and notes some of the limitations faced by an analysis of this kind.

4.0 - Methodology

The aims of this study, as outlined in the introduction, are to investigate the geography and determinants of educational inequality in England, and to consider what implications these

[9] Percentage foreign born, parental unemployment and health are examples of additional variables which may influence school attainment, but have not been included. Data availability, the theoretical constraints of Corak's model, and the possibility of capturing the effect by proxy are among the reasons these decisions have been taken.

findings could have for mobility policy. This is a broad aim, so this section will consider the specifics of how this can be achieved and present an operationalised research question.

4.1 - Data, Variables and Indices

All of the data has been sourced from the aforementioned 'Social Mobility Index', released in early 2016 by the Social Mobility and Child Poverty Commission. This was used in the government's own analysis, and is therefore considered to be a satisfactory and reliable source of information (it should be noted that much of the data used by the commission is secondary and comes from related branches of government - a complete list of variables and sources has been included in Appendix B). This does not exempt the data from limitations, however, and both general and specific issues are highlighted here alongside a description of each indicator.

Firstly, as described in the previous section, the quality of nursery schools in an area is one factor which may be influencing attainment levels. For this, the indicator '% of nursery providers rated 'outstanding' or 'good' by Ofsted' is used. The criteria Ofsted used in their inspections at the time were: how well the provider met the needs of the children that attended, the provider's contribution to the wellbeing of children, and the effectiveness of management (Ofsted, 2016). Nursery schools and childcare providers that scored well against these three criteria would receive a good or outstanding rating, whereas those scoring below would be required to take action to improve. These are fairly subjective criteria, but the critical thing for social mobility is that all pupils receive comparable education. A high score in this indicator, therefore, implies ubiquitous good quality education in a region.

Secondly, the quality of primary and secondary schools is considered for many of the same reasons. Here, the '% of children eligible for free school meals (FSM) attending a primary school rated 'outstanding' or 'good' by Ofsted' and the '% of children eligible for FSM attending a secondary school rated 'outstanding' or 'good' by Ofsted' have been combined (via mean average) to make a 'school quality index' for each area. The criteria schools are judged against are: effectiveness of management, quality of teaching/learning/assessment, personal development/behaviour and welfare, and outcomes for pupils (Ofsted, 2005). Again, schools which score well here are given a good or outstanding rating, whereas those scoring below are required to make changes and improve. A high score in this indicator suggests an area has ubiquitous, high quality schooling.

An important point on both these school and nursery measures is that they consider the location of the institutions rather than the location of the residents. A good school may take students from a large catchment area across constituencies, meaning the results reflect the performance of the institutions in a region rather than the residents of a region. This contrasts with the socioeconomic measures, which primarily comprise direct measurements of residents. This is a limitation emphasised by The Social Mobility and Child Poverty Commission (2016b), who state:

"This can mean that there is a very big difference between outcomes on a residence and on a service location basis if the attainment of those who enter a local area is very different to those who are educated elsewhere. For example, while 67 per cent of young people who live in Sevenoaks get 5 good GCSEs including English and maths, only 40 per cent of those who go to school there do."

(p. 7)

This weakens certain conclusions that perhaps could have been made more concretely with residence measures, such as relationships between attainment of the schools in one area and the home environment children experience. The 'characteristics of an area' that correlate with school attainment may be a useful way to conceptualise the analyses with this in mind. A further limitation (albeit one which may offset the last given the nature of boarding schools) is that only state-funded schools are considered. The 7% of pupils who attend private school do not feature in this analysis. The mechanisms through which high performing private schools can lower social mobility are fairly intuitive, however, and these schools can straightforwardly be considered to have a negative influence via parental investment in human capital development.

Returning to the variables, the socioeconomic measures included are fivefold. Firstly, three measures indicating the general affluence of a region have been included. These are the 'median weekly salary of employees who live in the local area', the '% of people that live in the local area who are in managerial and professional occupations', and the '% of jobs that are paid less than the applicable Living Wage Foundation living wage'. Including three was deemed necessary as the measures indicate slightly different permutations of affluence. The first is a strong general indicator, particularly as median measures are less affected by extreme earners in a constituency. The second can be taken as a loose proxy for the education level of the constituency in addition to earnings, as most managerial and professional jobs require a

minimum of post-16 qualifications. The third is a broad measure of deprivation, as it may be the case that deprivation and affluence do not correlate the same way. In addition to these three, the 'average house prices compared to median annual salary of employees who live in the local area' has been included to act as a proxy for the cost of living and level of disposable income families are likely to have on average, and the '% of families with children who own their home' is a related measure which may also indicate a level of 'stability' in the home environment. These latter two are the most subject to the limitation of 'residency vs service location', and so will be taken as broadly indicative of a trend or potentially an area of future research if relationships are found.

Lastly, the dependent variables are two indices which have been constructed from the attainment levels of pupils in each constituency. The measures '% of early years pupils achieving a good level of development', '% of KS2 pupils achieving level 4 and above in reading, writing and mathematics' and '% of KS4 pupils achieving 5+ A*-C including English and mathematics' have been averaged to indicate the 'absolute attainment' of each constituency. This measure indicates the average level of attainment for each region, and will be useful in highlighting differences around the country, as well as in investigating the characteristics of high achieving regions. The second dependent variable is constructed from the same indicators, but takes the difference in attainment between pupils eligible for FSM and those not eligible as a measure of equality of opportunity. This difference is calculated for all three age groups, and then is again averaged to make one composite figure for each region. This statistic is useful for judging whether a region has achieved equality of opportunity internally, but does not indicate the level of attainment at which it has hypothetically been achieved. The two dependent variables are complementary, therefore, and help to paint a complete picture of educational inequality in England. It should also be noted that the data used to construct these variables was not included in the Social Mobility Index's analysis, but instead was added to the online data package at a date after publication.

Finally, all the data is from the years 2014-2015, making this a current and cross-sectional study. Many social mobility studies and child development studies are longitudinal, and construct 'storylines' of individuals as they progress through education and the labour market. These kinds of studies are invaluable for accurate breakdowns of mobility processes, but often take several years to emerge – most intergenerational income elasticity estimates, for example, concern middle-aged adults and the earnings of their parents, and hence do not provide a useful

guide to contemporary policy. A snapshot of educational inequality in a given year, incorporating multiple cohorts of children, has multiple benefits against these limitations – it is a relevant way to present the infrastructure for mobility in England for the young generations, and is informative to policymakers as it highlights current failings. The two kinds of study can again be thought of as complementary, as this work will tend to be more descriptive / crude and less causal. That being said, the cross-sectional nature of the data perhaps brings the study one step closer to identifying causality in a qualitative sense – the exam results and attainment of 2014/15 cohorts are unlikely to have shaped the socio-economic profile of the region in the same year, so this temporal element may be indicative of an underlying quantitative mechanism. A final point is that the average of three age groups in the dependent variables was taken to incorporate multiple cohorts in the analysis – the study is not concerned with age-specific inequality, but attainment at young ages is highly correlated with attainment at older ages (as outlined above), and this approach better integrates future generations[10]. This same justification can be used for the composite index of primary and secondary school quality.

4.2 - Geography and GIS Maps

The level of analysis is 'Local Authority District' (LAD) – a subdivision pertaining to the areas under control of local governments across England. Some regions, such as Cornwall and Wiltshire, are run by Unitary Authorities rather than LADs, and show up larger on the maps (although this should not impact the analysis in any way). These LADs are distinct from political constituencies, although there is significant overlap between the two classifications.

The two dependent variables have been mapped onto separate regional projections of England in order to visualise spatial trends, and the geography of equality of opportunity. This was accomplished using ArcGIS software and a British National Grid projection. As this exercise is essentially a visualisation of the data rather than an investigative analysis in itself, the projection is not subject to extensive methodological flaws. There are, however, two technical issues to note regarding the maps and the way the data is presented: Firstly, some LADs had unusable data, and have been removed from the analysis for this reason. They are the Isles of

[10] The 'correlation' section of the methodology has been repeated using only the oldest cohort of the three, and the results are extremely similar to those found by taking the mean. The largest difference across all 15 correlations is 0.1 in the r value, and the median average difference is under 0.05.

Scilly, Kensington and Chelsea, the City of London, Melton, and the county of Rutland – all show up white on the maps. Secondly, the maps have been presented using a scale which sorts LADs into seven bands of approximately equal size. The absolute range of the bands is unequal in order to accommodate this, so care should be taken in the interpretation of the patterns.

4.3 - Data Analysis

This study is more descriptive than causal, and there are high levels of multicollinearity between the independent variables (particularly the different measures of affluence). As such, a multiple regression has not been attempted, and the data analysis instead comprises a series of correlations and examination of the patterns therein, accompanied by the relevant R, P, Standard Error and Observation statistics for each relationship (all produced using Microsoft Excel). Further justification for this decision lies in the scope of the study – this is a fairly exploratory exercise, as not a great deal of regional analyses have been carried out on educational inequality, nor social mobility, in the UK to date. Correlations should be sufficient to help to identify the broad characteristics of regions with high/low general attainment and a high/low attainment gap, be roughly indicative of mobility rates around the country, and potentially guide future policy or research in the field.

In addition to the LADs excluded from the GIS exercise, a further three areas have been excluded from the data analysis due to unusable data. These are Purbeck, West Somerset and Chesterfield, bringing the total number of observations to 318. It is worth noting the omission of West Somerset in particular, as this local authority was the worst performing (by some distance) in the government produced 'Social Mobility Index' (against both general and education-specific criteria).

4.4 - Research Question

As specified above, this paper has two central aims:

- To explore the geography and the determinants of educational inequality in England
- To consider the implications of this for social mobility policy

The first of these is targeted explicitly in the methodologies above, and the second is addressed further in the 'Discussion and Conclusion' section below. In addition to these broad aims, it is valuable to state the minutiae of this approach with an operationalised research question. While

the introductory section outlined a succinct and less verbose problem, this section looks to offer a detailed and technical version to lucidly define the objective of the analysis at hand. Given that all relevant key terms have now been defined, a move can be made from:

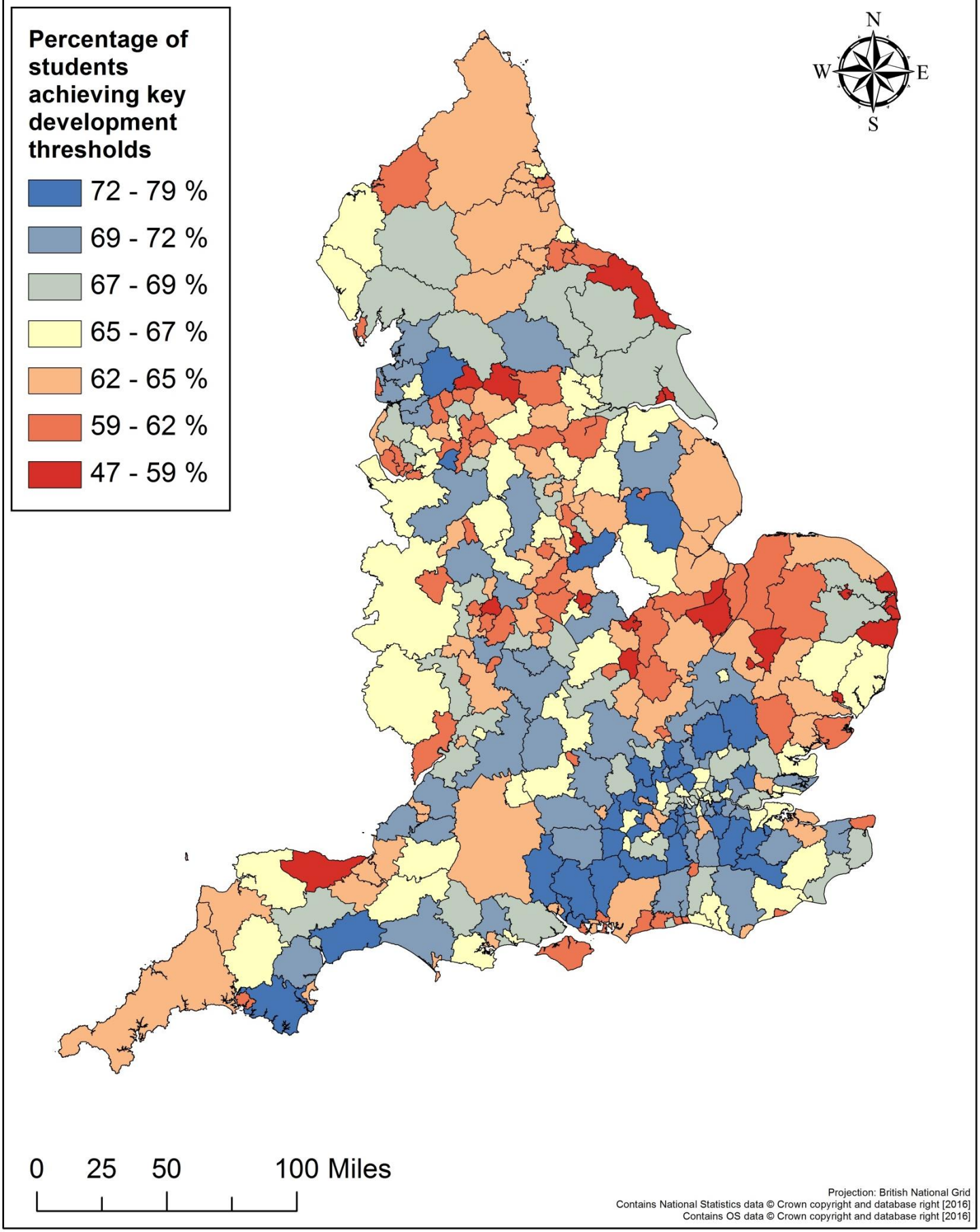
How did 2014-15 school attainment vary within and between regions in England, and to what extent are these differences correlated with the socio-economic and infrastructure profiles of said regions?

To:

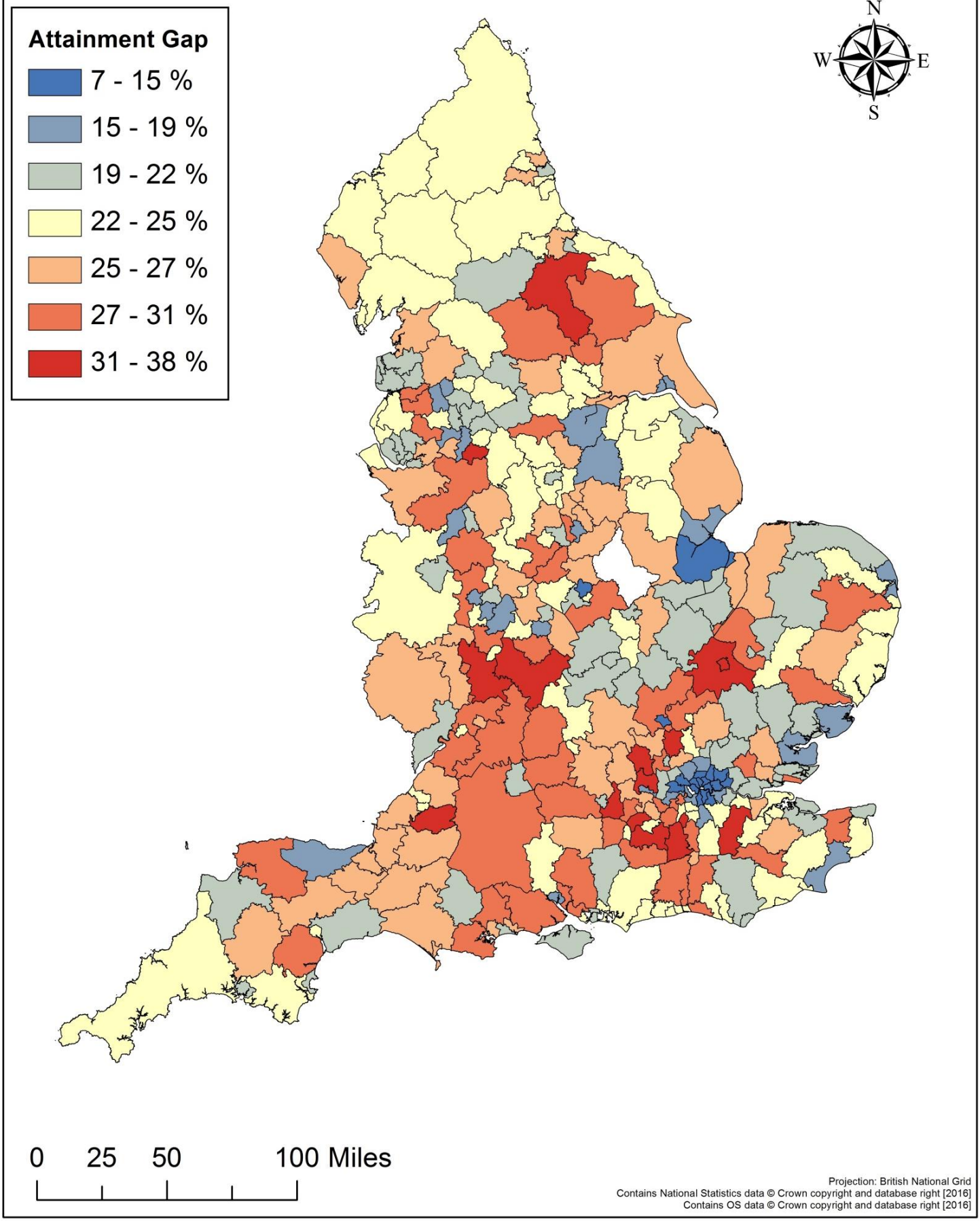
In the academic year 2014-15, how did the percentage of pupils reaching key development thresholds at KS1, KS3 and GCSE level vary within and between English Local Authority Districts, and to what extent are these differences correlated with the Ofsted results and socioeconomic profiles of said regions?

The following section presents the results of this enquiry.

Geography of Absolute Attainment in England



Geography of the Attainment Gap in England



Projection: British National Grid

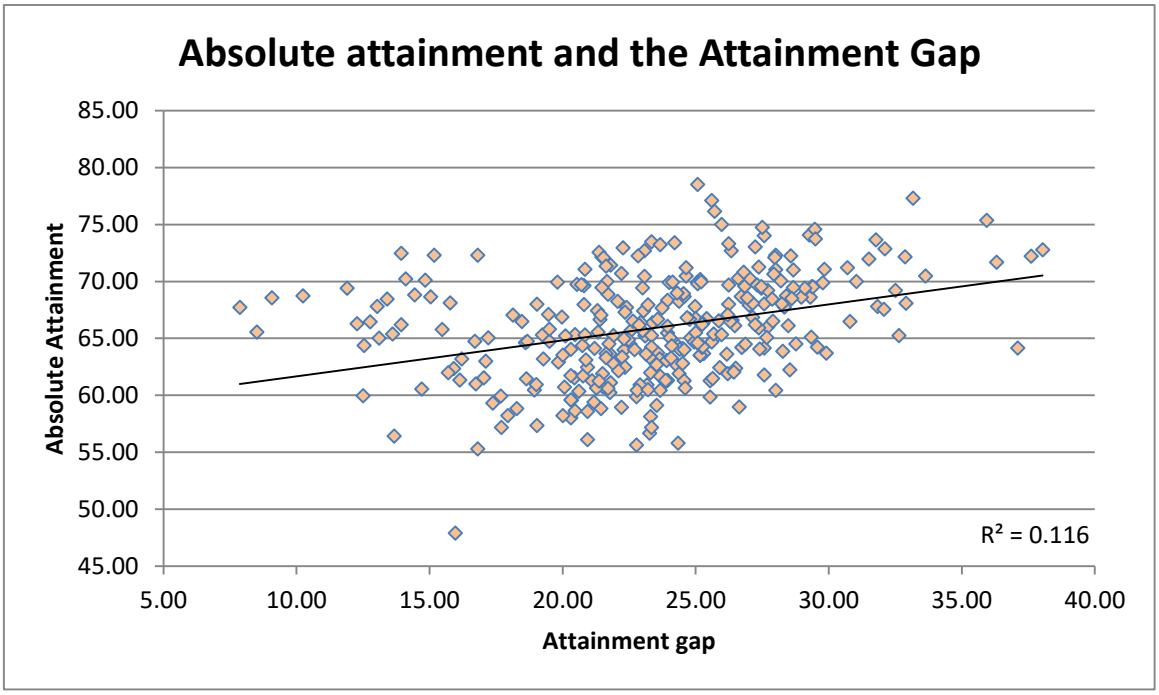


Figure 6: Absolute Attainment and the Attainment Gap

R	0,33
Standard Error	4,64
Observations	318,00
P-value	0,00

Figure 7: Absolute Attainment and the Attainment Gap: Mean Positions by Region

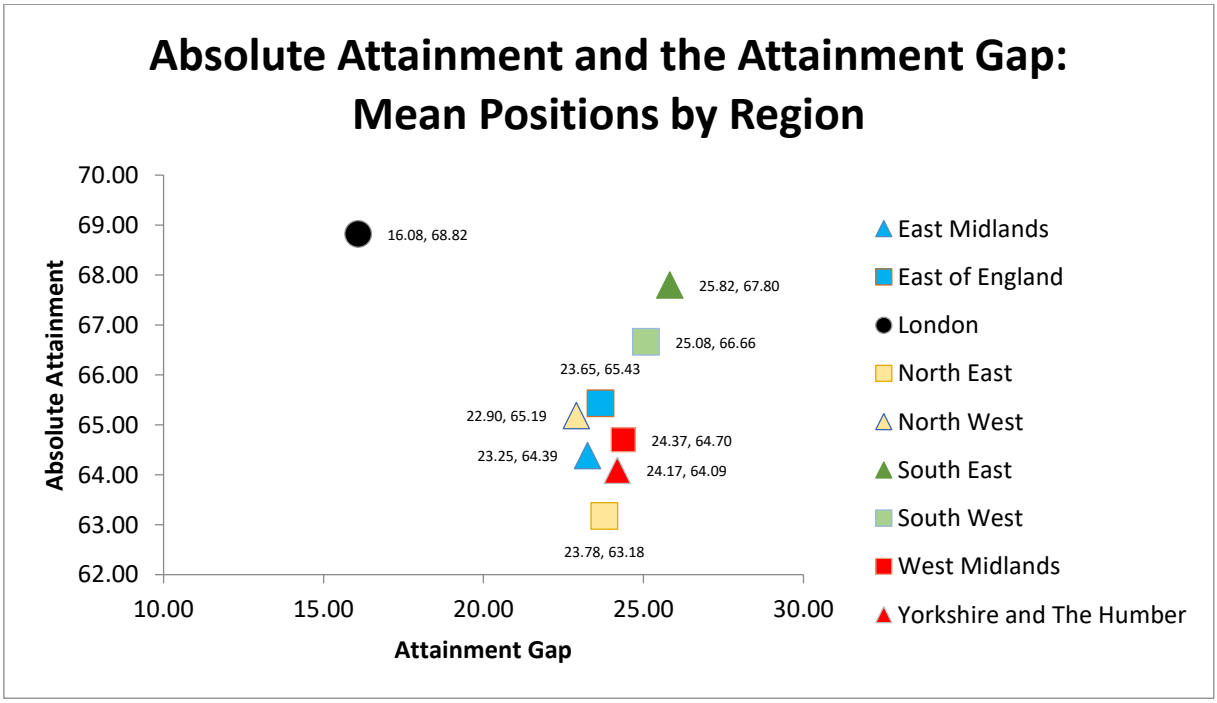
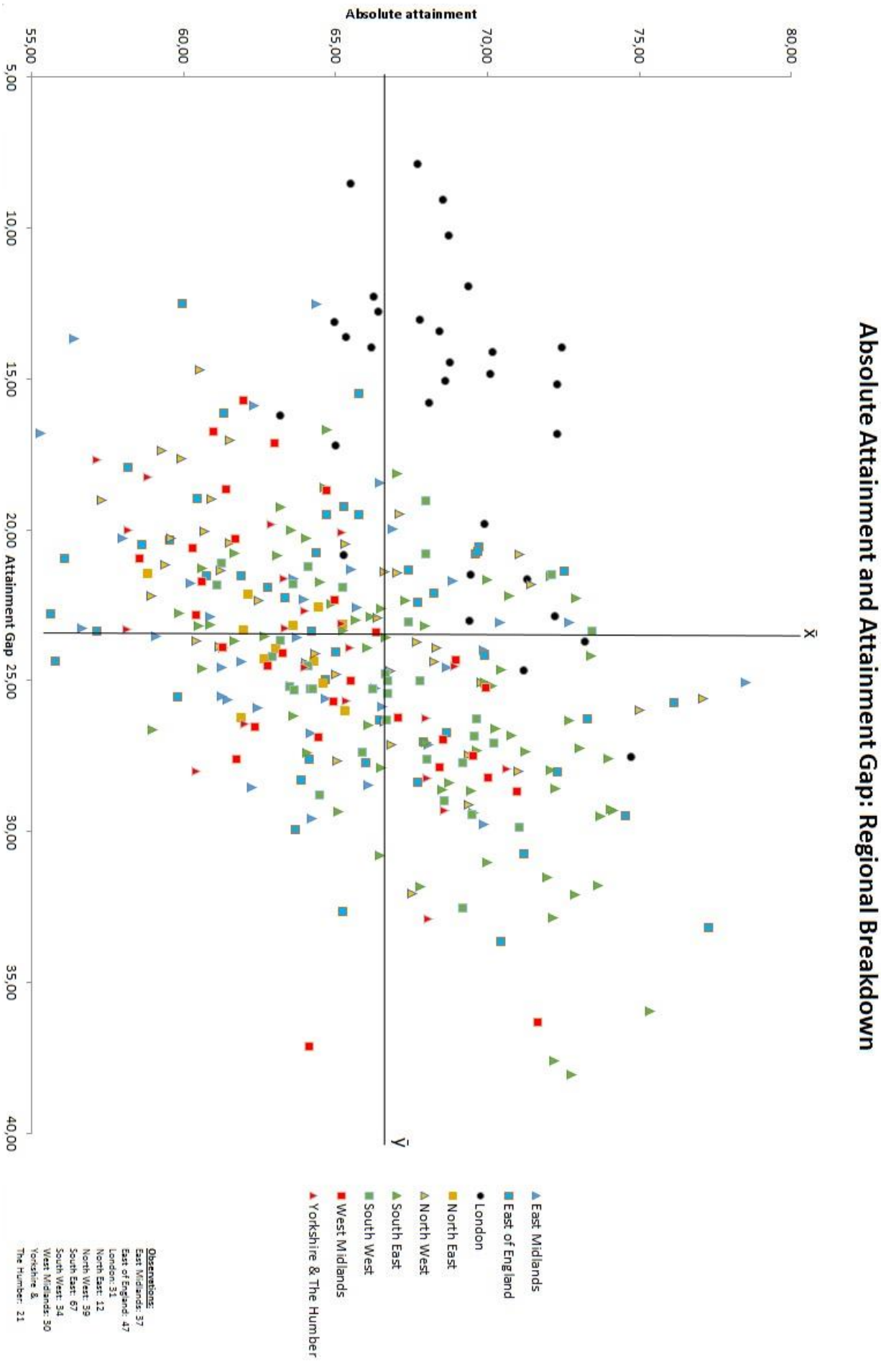


Figure 8: Absolute Attainment and Attainment Gap: Regional Breakdown



5.0 - Results

This section presents the results of the methodologies described above, as well as offering a visual analysis of each of the figures in turn. As the maps are not annotated, a county map, urban map and region map have been included as appendices for reference.

5.1 - Absolute attainment

5.1.1 - Map

Figure 4 shows how levels of the 'Absolute Attainment' index vary around England, and there are several emergent trends. Firstly, the suburbs of Greater London are the highest performing regions, with a large share of the LADs achieving above 69% on the index. Central London performs slightly worse, however most of the areas in the region are at or above the national average for attainment. The largest contrast on the map is between the Northern London suburbs and the Cambridgeshire region above. This is the worst performing part of the country, with both small and large LADs shaded red and with few students achieving key development thresholds. A similar contrast can be found between Manchester and Southern Lancashire, with several of the worst performing districts bordering several of the best. The Manchester / Sheffield region appears to be the second worst performing area of the country in broad terms.

Attainment in the North of England is mixed, with Cumbria faring better than most of the North East. Newcastle and Middlesbrough in particular perform particularly poorly against this indicator, as does Hull – drastically so given its successful surroundings. Further South, the 'Heart of England' region and the South West have mixed results, with several strong LADs along the South coast and to the North of Bristol. There is a clear difference between the South and North coasts of the West Country, with West Somerset and surrounding LADs performing below average. In the midlands, Birmingham and Nottingham perform poorly, but some of the (larger) more suburban regions fare better, such as around Staffordshire.

Two general trends can be spotted in addition to the more regional patterns. Firstly, the most rural and most urban areas appear to suffer against this measure of attainment, whereas suburban and commuter districts perform highly. This is particularly pronounced along the South Coast, with several blue and dark blue regions surrounding orange, red and dark red urban centres (Plymouth, Bournemouth and Poole, Southampton, Portsmouth and Brighton are examples of this), and the more agricultural areas of Wiltshire, North West Devon, and Somerset scoring low. London, as the UKs most urban region, bucks

this trend to a certain extent. While the suburban regions do attain better results, the inner city rates are also of a reasonable quality.

5.1.2 - Correlations

A number of the variables showed strong correlations with the level of absolute attainment. The median weekly salary (Appendix D.iii) and % of professional occupations (Appendix D.v) were the most associated, with R values of over 0.55. The average house price and salary ratio (Appendix D.vi) was also quite steeply correlated, with an R of 0.52, as was the primary and secondary school quality measure (Appendix D.ii). A small association is evident against the home ownership statistic (Appendix D.vii), although this appears to be influenced by a number of outliers, and both nursery schools (Appendix D.i) and the deprivation measure (Appendix D.iv) failed to show strong effects, although both were still statistically significant to the $p \leq 0.05$ level.

5.2 - Attainment Gap

5.2.1 - Map

Figure 5 shows the geography of the attainment gap within LADs in England, as measured by the difference in attainment between pupils with and without free school meal access. This measure was interestingly distributed around the country. Firstly, Central London performs extremely well, with almost every city LAD having a gap of under 20%. There is a strong contrast, however, with the performance of the Western commuter zones and suburbs such as Surrey, which appear to be particularly unequal in their internal attainment. This high attainment gap extends further West, where the entire 'Heart of England' region does poorly, particularly in the areas immediately South of Birmingham. The East and South East have mixed performance, with Southern Essex standing out as a positive. The South West is also varied, and this time the coastal trends disappear, although it should be noted the whole area performs slightly below average.

Further North, Manchester and Liverpool have a mixture of LADs, but generally show positive low rates. Across the North there is a mediocre attainment gap, and the large amount of yellow is particularly striking when one considers this only represents a 3% range of possible values. The areas around Northern Yorkshire are the exception to this, with a higher attainment gap and more negative shading. To the North of London, the Cambridgeshire region redeems itself to a certain extent, although some of the LADs in the region perform poorly against both indicators.

Broadly speaking, the general trend is reversed, with urban areas such as Hull, Birmingham and Southampton performing better than their surrounding areas. The small size of these regions makes the map seem darker in general. The trend is not so clear cut, however, and Bournemouth and Poole, Bristol, and several other smaller LADs appear to have a steep gradient between the achievements of rich and poor pupils. Most of the strong performances are clustered in London, and most of the worst performers are in rural Yorkshire or near rural Wiltshire, as well as in the London commuter zones.

5.2.2 - Correlations

There were less significant relationships against the attainment gap variable, with only four of the seven independent variables correlating at $p \leq 0.05$. No association was found against the salaries in the area (Appendix D.x), the house price and salary ratio in the area (Appendix D.vi), or, interestingly, the percentage of children attending good or outstanding schools (Appendix D.ix). Of the significant relationships, by far the strongest association was between the attainment gap and the levels of home ownership in a region (Appendix D.xiv), with a Pearson's r statistic of 0.68. The number of managers and professionals in a region (Appendix D.xii) also seems to have a notable impact on the attainment gap, with areas having higher proportions of adults in these kinds of work having a wider gap in general. Finally, there was a significant correlation with the quality of nursery schooling in an area (Appendix D.viii), with an R value of 0.34.

5.3 - The Attainment Gap and Absolute Attainment

There is a reasonably strong association between an area having higher performance in general and having a wider attainment gap internally, with the two dependent variables correlating significantly at R=0.33 (Figure 6). This suggests a quality / equality trade-off is occurring to some extent, although there are a number of LADs that achieve neither or both.

This is explored further in Figures 7 and 8, which show that the London constituencies disproportionately achieve both high general attainment and a low attainment gap; several of these LADs are in isolation in the top left of the chart. Elsewhere in the country, it is evident that many of the worst general performers are in the South East, with many LADs from this region in the high gap / low attainment portion of the graph, despite this region having the second highest average attainment. At the extremes of the prevailing relationship, the North West is highly represented in the low gap / low attainment quartile, and the South East and South West dominate the high gap / high attainment quartile. On the absolute attainment axis, it is worth noting that all of the Southern regions finish higher than all of the Northern regions, evidencing what is popularly referred to as the 'North-South divide'. Finally,

one other notable trend is that constituencies in the North East are the most highly clustered (in the centre of Figure 8), with almost every sub-region having an average attainment gap but slightly lower grades in general.

6.0 - Discussion and Conclusion

Both the spatial and correlative analyses above were able to reveal clear patterns and trends concerning educational inequality in England. This section looks to expand on those revealed elements, consider what they show and how they relate to one another, and place the findings in the context of wider social mobility literature and research. Firstly, the findings will be related back to their methodological roots and theoretical underpinnings. Secondly, the ways in which this analysis has furthered the understanding of mobility in England are outlined, as well as the extent to which the findings are consistent with earlier work. Thirdly, there is a brief consideration of what impact these findings, if corroborated, could have beyond academia and in policy discussions. Lastly, some closing remarks are made in a conclusion, reiterating the theory, aims and findings of the study, and presenting a look forward from this paper.

6.1 - Analysis of Results

The maps of the two dependent variables (Figures 4 and 5) were included as a fairly descriptive exercise, looking to outline the geography of equality of opportunity around England. As not a great deal of work has been done 'unpacking' the UK's low mobility previously, particularly on a regional basis, these fairly straightforward visualisations provide a great deal of insight into where in the country these issues are most severe. It is revealed, as described above, that London stands out as a region of high mobility and high attainment. Elsewhere in the country a more complex trend emerges, however: the suburb and commuter zones have high attainment and internal inequality, whereas inner city regions and the most rural areas have a reasonably low attainment gap, but achieve this in an environment of low average attainment. This would appear to indicate that vulnerable children have the most opportunity for educational success when schooled in London, whereas wealthier pupils would benefit from the high general attainment and high socioeconomic gradient of places like Surrey, Herefordshire and Worcestershire.

It should be emphasised that outside of London there are few opportunities for children eligible for free school meals to succeed, with only a handful of LADs from (predominantly) the East and South East achieving both high attainment and a low/average attainment gap (Figure 8). Another reading of this pattern is that outside of London, you have to be wealthy to stand a (statistical) chance of educational success. Conversely, there are many places where both low attainment and a high attainment gap prevail, mostly in the West Midlands, Yorkshire and The

Humber, and the North East (Figure 7) – it could be said that vulnerable children in these regions have the least chance of educational success, given that they are highly unlikely to even match the average attainment of their wealthier peers. This emphasises a wider trend of a North / South divide; particularly evident on Figure 7 where all of the Southern regions finish above all of Middle England and The North.

The correlations provide further insights, and the characteristics of regions with a high attainment level or high attainment gap are made clear. By cross-referencing these with the GIS maps, it is possible to deduce an archetype for the kinds of regions that have high and low opportunities. It appears that high average attainment is clustered in the South and, fairly intuitively, found in wealthy suburbs and commuter regions, where many adults work in managerial and professional occupations, wages are high and deprivation is low. These areas have the best quality schools and nursery schools, high rates of home ownership, and a high cost of living. Taking the measures as proxies, this may also be indicative of high levels of education in the local adult population, stable home environments, and a steep gradient in the capacity of parents to make extra-curricular investments (bearing in mind the region/residency limitations). These areas clearly have fewer children on free school meals, but for those that happen to be there is a steep attainment gap, meaning they are unlikely to reap the benefits of their wealthy surroundings.

A region with a low attainment gap does not have such obvious characteristics, and perhaps the more drastic findings of this study can be found in the geography and determinants of this metric. Having a low internal attainment gap seems to be highly common in both London boroughs and regions with low average attainment, but the socio-economic and infrastructure variables correlate in a less clear pattern. Areas with higher quality nursery schools appear to have a higher attainment gap, although the quality of the primary and secondary schools does not seem to have an impact. A very large determinant appears to be the levels of home ownership in a region, which correlate extremely strongly with a widening attainment gap. This is an unusual finding, as is the negligible impact of school quality, and taking these two together may indicate that home environments have a greater impact than educational spaces on equality of opportunity, at least at the local level (again bearing in mind the service/residency limitations of this assertion). There are also relationships with deprivation and the managers/professionals statistic, but not with other measures of affluence, which may indicate higher education levels in an area are impacting the attainment gap. The typical profile of an area with a low attainment

gap, therefore, is difficult to pinpoint. The tendency seems to be towards deprived constituencies with low levels of home ownership and poor quality nursery schools, but the relationships are not as clear and there are several exceptions to these correlations. An important point to note is that while London has an exceptionally low attainment gap and influences all of these relationships, the stronger correlations exist on a continuum outside of the capital, as can be seen from the appendices.

These regional archetypes help our understanding of educational inequality and social mobility in England, and help to unpack the high income elasticity in the country. It appears that London is not a big contributor to inherited status and human capital levels, and inequality persists because of the urban/commuter divide around the rest of the country. Most children schooled in the inner city attain low grades, regardless of their status, whereas those schooled in the suburbs by wealthy parents achieve much higher grades. Even if poorer children find themselves educated in these high achieving regions, however, they are left behind by their wealthy peers. This issue is exacerbated by general levels of deprivation, evidenced by a North/South divide. If talent is assumed to be close to randomly distributed, this implies a large waste of human capital in these more unequal regions, with potential (albeit unquantifiable) losses in human resources for the British labour market.

6.2 - Implications for Academia

As to whether these patterns are consistent with where we might expect inequality of opportunity to lie, there are some findings which corroborate earlier research and some which contradict the body of work. Firstly, many of the regional patterns of educational inequality relate to the regional patterns Chetty, et al. found in their analysis of income mobility. The study includes comparable results to the 'absolute attainment' metric, with the authors finding: 'urban areas tend to exhibit lower levels of intergenerational mobility than rural areas' (p. 1593), former industrial cities performing particularly poorly ('Rust Belt' cities in the US (p. 1596), the urban parts of the Midlands and Merseyside in the UK), and high mobility in the global megacities of New York and Los Angeles (p. 1594), comparable to London in England. One contradictory result was that the most rural parts of the US had some of the highest mobility (p. 1591), whereas attainment was quite poor (and the gap quite wide) in these regions in England. Rural states in the US are far less densely populated than the rural areas in the UK, however, and the two areas may not be comparable. Of the correlates that were considered in both studies - school quality, income (income inequality in Chetty, et al.), family structure (using home

ownership as a proxy here) and education (social capital in Chetty, et al., managerial and professional occupations as a proxy here) - several were correlated in both studies. Chetty, et al. found strong relationships with all of these characteristics, and this study finds they are associated with either/both the differences between regions or the differences regions exhibit internally. These replicated findings strengthen the association between education and mobility, and help to paint a picture of typically high and typically low mobility regions across nations. One constant that may be particularly interesting for future research is the high mobility in megacities: As hugely unequal spaces, this does seem to contrast with the income inequality model of social mobility, and specific pro-mobility processes appear to be occurring in megacities that are not present in smaller urban areas. A potential explanation is simply the attraction of 'the city' and the density of high and low achievers in such a space, although the local governmental nuances in school funding or structure may also play a role and must be considered (London schools are notably well funded in the UK).

This study has also corroborated some of the findings of the British government's own 'Social Mobility Index', although others have been contradicted. The strong results in London and the South East are consistent across both studies, but this study reveals that the London commuter belt is actually the region with the least internal mobility in education – a finding difficult to infer from the index's own GIS maps, which do not take this measure into account. Broadly speaking, the 'absolute attainment' map is consistent with the government's visualisations, and the inverse is true for the 'attainment gap', with the exception of London. As an extension of this, and regarding the relationship between the internal attainment gaps and average levels of attainment in a region, this study finds a fair negative relationship between the two dependent variables and a 'quality/equality trade off', again with the exception of London. This contradicts Schütz, et al. (2005), who found no relationship between these two measures on the international scale. These consistencies and inconsistencies further our understanding of mobility in England, as they highlight the need to consider inequalities on every scale. A point for further consideration, and a potential area for further research, is that different processes appear to operate on the intra-national, national and international scales, with home ownership (or home environment), general affluence, and income inequality seeming to dominate at these respective levels.

6.3 - Implications for Policy

A policymaker looking to improve mobility in England through education would be forced to take a nuanced approach given the results of this study. Corak's model and the inequality of opportunity framework postulates that equal chances should be given to all children to accumulate human capital. As these results show, this is not the case, and several factors including geography, wealth, access to infrastructure, and socioeconomic circumstances are determinates of what children are able to achieve. At present, wealthy parents able to educate their children in affluent suburbs will maximise their life chances, whereas poorer parents in the North of England, forced to educate their children in underperforming urban regions, will leave them with a much lower chance of achieving even nationally average grades. As universities recruit on a national scale, this will lead to children born to certain families in certain regions being significantly overrepresented in top institutions like Oxford and Cambridge; something which is already evident in current admissions statistics.

Against the tide, it seems that London is performing very well, although the reasons for this remain unclear. Elsewhere in the country there are clear patterns of attainment rising alongside inequality, however, and these would have to be addressed to ameliorate the causes of low mobility. To homogenise the quality of education for all English children, standards in the North of England, Cambridgeshire and the Midlands would need to be improved drastically; the relationship between average attainment and school quality suggests this may be possible through infrastructure investment to some extent. If these interregional differences can be ironed out, attention then must turn to the internal attainment gradients of LADs in the wealthier parts of the country, which, at present, are leaving vulnerable children behind. These differences are less related to school quality, and appear to be generated in the home environment. Finding the best way to reduce the influence of the home environment on attainment is beyond the scope of this study, although intuitive suggestions would include either reducing the amount of homework pupils are set or offering an after-hours environment where it can be completed with the support of teachers.

Alternatively, and as an aside, novel approaches are being taken in some environments to compensate pupils for their 'birth lottery' after primary and secondary education. The aforementioned Texan public university, which recruits its students on the basis of their relative experience, is one example of this – statistics released on the socio-economic and ethnic background of their students show that these factors matter far less in admissions when the relative approach is taken. In 2012, for example, those students admitted through the 'Top 10%'

scheme were from diverse socio-economic circumstances (The University of Texas at Austin, 2014, p. 31), with 9-18% of students coming from each income quintile (with no discernible pattern therein). Those students not recruited through this scheme were a much wealthier demographic, with only 4% coming from the lowest income bracket and 32% coming from the highest (with a clear positive relationship therein). As this scheme had a positive impact on student performance, it may be a straightforward way to increase mobility at a low cost. A similar approach is taken by Rare Recruitment in the UK; a recruitment agency which considers students in terms of their relative experience and compensates any disadvantage in its profiling of candidates. This agency is serving large corporations such as Deloitte, Barclays and Clifford Chance (Rare Recruitment, u.d.), demonstrating that mobility initiatives of this kind are beginning to garner cache on productivity grounds. These measures can be thought of as transitionary, and are reactionary in the context of wasted talent in an unequal school system. This paper looks to disentangle the causes of low mobility, rather than simply dress the symptoms, however, and the most penetrative strategies to achieve this lie in educational reform.

6.4 - Conclusion

Relative social mobility is the extent to which status, or social standing, is 'sticky' across generations. This is best measured economically, and the preferred metric in mainstream academia is intergenerational income elasticity. The UK has one of the highest income elasticities in the OECD, and hence has a low level of social mobility. This can be considered an issue from both a social justice perspective, whereby certain children are born with unfair advantages or disadvantages, or from a 'meritocracy' perspective, whereby reward should be based on merit, and it is in the country's economic interest to increase mobility to improve labour market matching.

This study seeks to unpack the UK's low rate of mobility with an eye on improving the situation through policy. The mechanisms of low mobility are shown to be different forms of inheritance, the most important of which is the inheritance of human capital through unequal access to education. With this in mind, the study looks to explore educational inequality in the UK by considering its geography and determinants on a regional and inter-regional scale.

It is shown that differences between regions are stark, and wealthier areas of the country have better average grades. The London commuter belt and similar regions nationwide exhibit this

trend, with inner city regions and rural areas having the worst average performance, particularly in the North of England. Local Authority Districts that have high average attainment often have a large gap internally between rich and poor students, suggesting a poor student is no better off being schooled in a wealthy area than in a more deprived one. London is the exception to this trend, with a low attainment gap and high average attainment, indicating ubiquitous, high quality education that does not disadvantage any student to a large extent. The internal attainment gap is strongly correlated with home ownership and is not correlated with school quality, suggesting perhaps the home environment is more significant than the school environment in creating inequalities at the local level.

Many of these findings are corroborated by other research, particularly the poor performance of urban areas and other regional patterns investigated by Chetty, et al. in their analysis of income mobility in the USA. Novel findings, and potential areas for future investigation, include the relationship between high attainment and a high attainment gap on the regional scale, the strong performance of London against multiple criteria, and the home ownership correlation mentioned above. Regarding policy, this study does not propose new initiatives, but rather looks to target and specify the nature of educational inequality in a social mobility context. The ideal geography of any new initiatives should be evident from the results, and some of the significant correlates can guide further research.

To close, England must look to address the relationship between parental wealth and educational success if it wishes to improve mobility, offer equality of opportunity to its youth, and harness the natural talent of pupils from across the nation. Rather than viewing this as an egalitarian ideal, it should be viewed as something which has already been accomplished in the capital, and must now be replicated in other parts of the country. The London anomaly should be celebrated, investigated, and analysed to promote a more meritocratic society.

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Appendices

Appendix A: Education System in England

Basic outline

Here, a broad description of education in England is offered, for the benefit of those unfamiliar with the system.

Typically, nursery school is attended from ages 3-4. Children then attend a primary school, completing a transitional year known as 'reception' before beginning 'year 1' in the academic year they turn 6. Primary school is attended until age 11 or 'year 6', and culminates in a series of SAT examinations.

Secondary school is attended immediately after primary school, and begins in 'year 7' - the year in which pupils turn 12. Pupils take a range of subjects for 5 years and take progress examinations, with the final 2 years (10 and 11, ages 14-16) leading up to GCSE examinations in approximately 12 subjects. These age-16 exams represent formal qualifications, and students have historically had the option to leave education after their completion (this has changed in recent years – education is now compulsory until age 18). They are graded from A*-E (with the potential to fail and receive a 'U', meaning ungraded).

Following GCSEs, children have the option to take a range of post-16 qualifications, which usually take a further two years. The most common and most academic of these are 'A-levels', whereby students specialise in 3 subjects and take several exams over two years. These are again graded from A*-E (with the potential to fail and receive a 'U', meaning ungraded). Pupils who apply to university do so during their A-levels. The universities judge applications based on GCSE grades and the incomplete A-level results, as well as on personal statements and (occasionally) extra-curricular activities. The successful applicants receive an 'offer' – a minimum set of grades they need to achieve in their full A-levels in order to be admitted.

Key Stages and levels

During Primary and secondary school, pupils are expected to progress through a series of 'Key Stages' (KS), which have overlapping subdivisions known as 'levels' (L). KS1 (L1-3) is completed at age 7, KS2 (L3-6) is completed age 11, KS3 (L4-8) is completed age 14, and KS4

is synonymous with the GCSE courses in year 10 and 11. These reflect specific competencies in core subjects.

School Types

There are several types of school in England where pupils can study for and take the aforementioned examinations. The most common are ‘state schools’, which can be either privately or publically owned, and admit all students within a catchment area. These are sometimes referred to as ‘comprehensives’. Some parts of the country, such as Kent, also have free-to-attend ‘grammar schools’, which only admit students who fare well in a competitive entrance exam. These are designed to make sure bright students have access to top quality teaching, but have been criticised for making other schools in the region ‘second-rate’. Lastly, around 7% of the pupil population attend independent schools, which are fee-paying and can charge large premiums to parents. Many of these schools, such as Eton and Harrow, are referred to as ‘public schools’ and should not be confused with free-to-attend ‘state schools’.

Appendix B: Primary data sources

Indicator		Data Source(s)	Link (if applicable)	Comments
Early Years	% of nursery providers rated 'outstanding' or 'good' by Ofsted	Ofsted, *Childcare inspections and outcomes as at 31 March 2015*, 2015	https://www.gov.uk/government/statistics/childcare-inspections-and-outcomes-as-at-31-march-2015	
School	% of children eligible for FSM attending a primary school rated 'outstanding' or 'good' by Ofsted	Original analysis carried out by the Social Mobility and Child Poverty Commission. Based on data from Ofsted, *Maintained schools and academies: inspections and outcomes Sep 2014 to Aug 2015*, 2015 and Department for Education, *Schools, Pupils and their Characteristics*, 2015	Not applicable	Combined into an index by taking the mean average of the two percentages
	% of children eligible for FSM attending a secondary school rated 'outstanding' or 'good' by Ofsted	Original analysis carried out by the Social Mobility and Child Poverty Commission. Based on data from Ofsted, *Maintained schools and academies: inspections and outcomes Sep 2014 to Aug 2015*, 2015 and Department for Education, *Schools, Pupils and their Characteristics*, 2015	Not applicable	
Socio-economic indicators	Median weekly salary of employees who live in the local area	ONS, *Annual Survey of Hours and Earnings - Resident Analysis*, 2014	https://www.nomisweb.co.uk/sources/ashe	
	Average house prices compared to median annual salary of employees who live in the local area	ONS, *Annual Survey of Hours and Earnings - Resident Analysis*, 2014 and ONS, *House Price Statistics for Small Areas 1995 to 2014*, 2014	http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-406271	
	% of people that live in the local area who are in managerial and professional occupations (SOC 1 and 2)	ONS, *Annual Population Survey,* 2015	https://www.nomisweb.co.uk/sources/aps	
	% of jobs that are paid less than the applicable Living Wage Foundation living wage	ONS, *Estimates of employee jobs paid less than the living wage in London and other parts of the UK*, 2015	http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-415676	
	% of families with children who own their home	Census 2011, *Table DC4101EW: Tenure by Household Composition*, 2013	https://www.nomisweb.co.uk/census/2011/dc4101ew	
Dependent Variables	% of early years pupils achieving a good level of development (All pupils, all FSM pupils & all non-FSM pupils)	Data for the Social Mobility Index, 2016	https://www.gov.uk/government/publications/social-mobility-index#history	Combined into an 'absolute attainment' index by taking the mean average of the 'all pupils' statistic, and into an 'attainment gap' index by taking the mean of the FSM / non-FSM percentage difference.
	% of KS2 pupils achieving level 4 and above in reading, writing and mathematics (All pupils, all FSM pupils & all non-FSM pupils)	Data for the Social Mobility Index, 2016	https://www.gov.uk/government/publications/social-mobility-index#history	
	% of KS4 pupils achieving 5+ A*-C including English and mathematics (All pupils, all FSM pupils & all non-FSM pupils)	Data for the Social Mobility Index, 2016	https://www.gov.uk/government/publications/social-mobility-index#history	

Source: Author, adapted from Social Mobility and Child Poverty Commission (2016c)

Appendix C: Reference Maps

Appendix C.i: Counties map of England

Source: Pictures of England (online)

Appendix C.ii: Urban map of England and Wales

Source: metbrief.com (online)

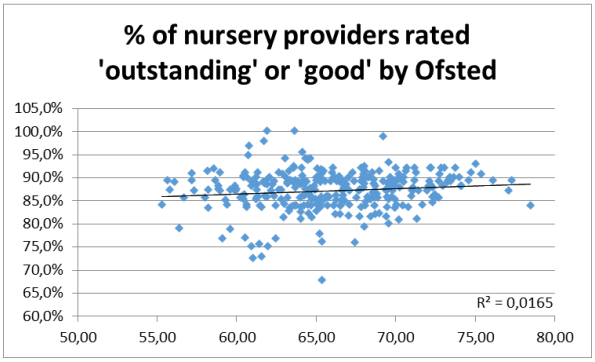
Appendix C.iii: Regional Map of England, Scotland and Wales

Source: Project Britain (online)

Appendix D: Correlative Analysis

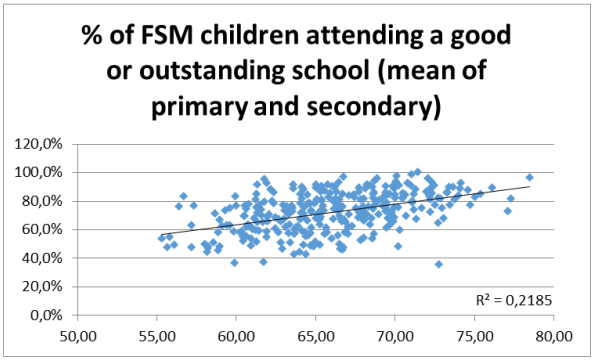
Absolute Attainment (x-axis) Correlations

Appendix D.i



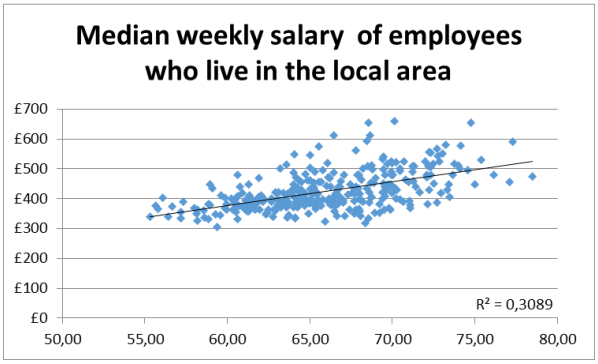
Statistics	
R	0,13
Standard Error	4,43
Observations	318,00
P-Value	0,02

Appendix D.ii



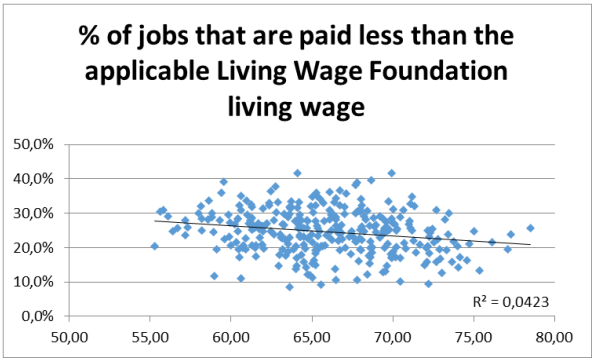
Statistics	
R	0,47
Standard Error	3,95
Observations	318,00
P-Value	0,00

Appendix D.iii



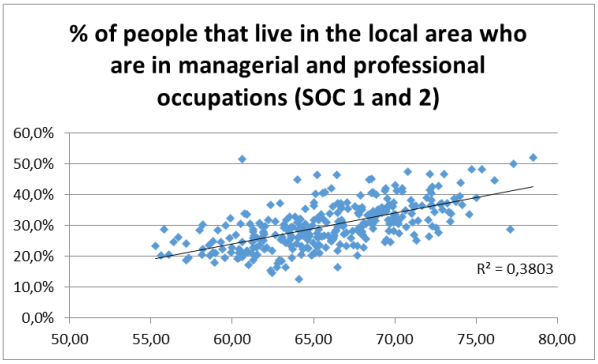
Statistics	
R	0,56
Standard Error	3,71
Observations	318,00
P-Value	0,00

Appendix D.iv



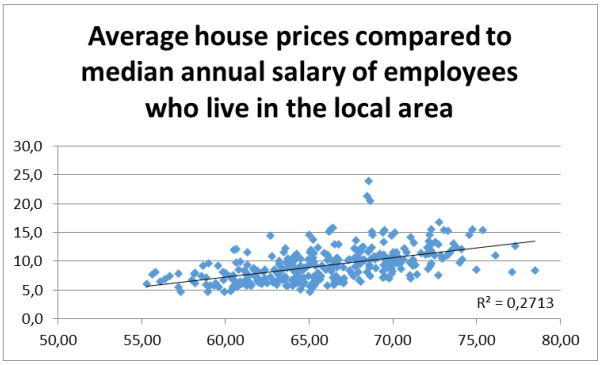
Statistics	
R	0,21
Standard Error	4,37
Observations	318,00
P-Value	0,00

Appendix D.v



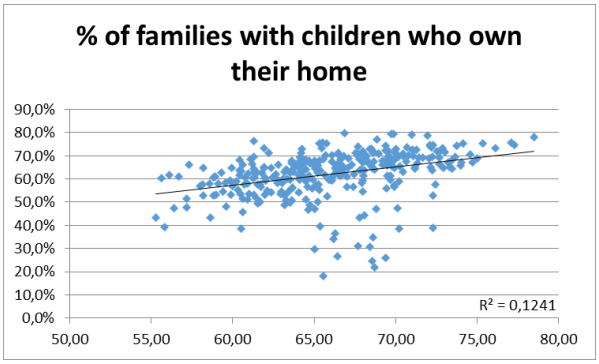
Statistics	
R	0,62
Standard Error	3,52
Observations	318,00
P-Value	0,00

Appendix D.vi



Statistics	
R	0,52
Standard Error	3,81
Observations	318,00
P-Value	0,00

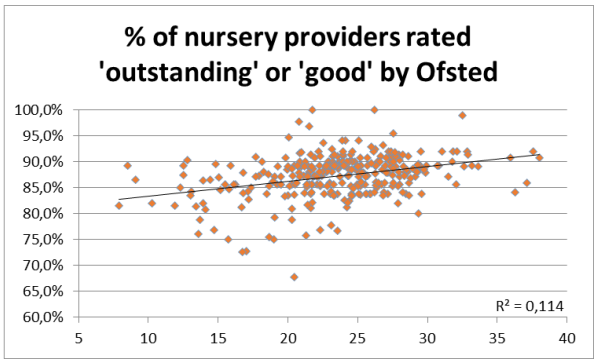
Appendix D.vii



Statistics	
R	0,35
Standard Error	4,18
Observations	318,00
P-Value	0,00

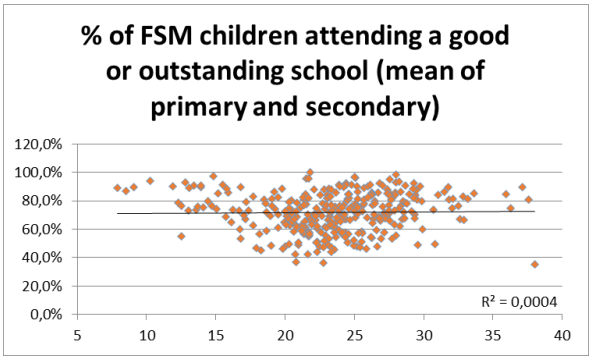
Attainment Gap (x-axis) Correlation

Appendix D.viii



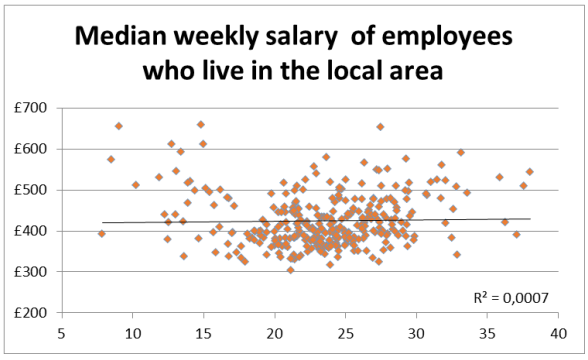
Statistics	
R	0,34
Standard Error	4,63
Observations	318,00
P-Value	0,00

Appendix D.ix



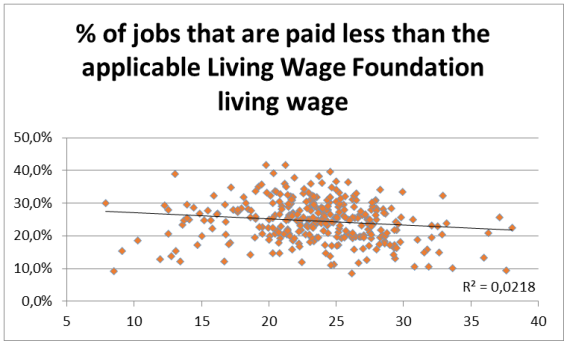
Statistics	
R	0,02
Standard Error	4,92
Observations	318,00
P-Value	0,71

Appendix D.x



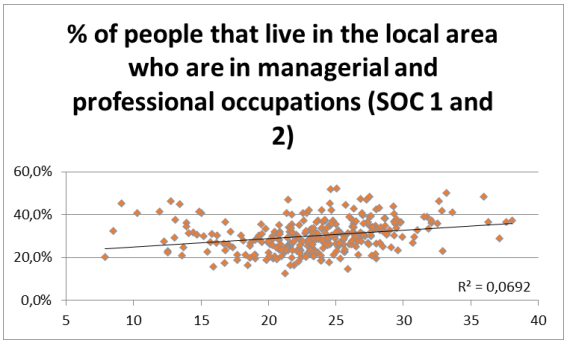
Statistics	
R	0,03
Standard Error	4,92
Observations	318,00
P-Value	0,63

Appendix D.xi



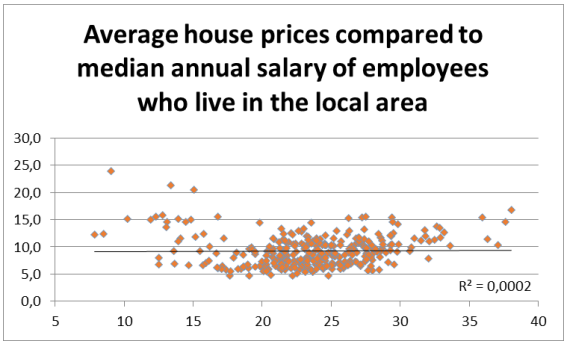
Statistics	
R	0,15
Standard Error	4,87
Observations	318,00
P-Value	0,01

Appendix D.xii



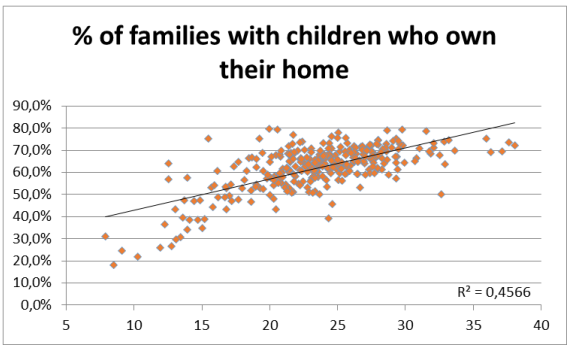
Statistics	
R	0,26
Standard Error	4,75
Observations	318,00
P-Value	0,00

Appendix D.xiii



Statistics	
R	0,01
Standard Error	4,92
Observations	318,00
P-Value	0,80

Appendix D.xiv



Statistics	
R	0,68
Standard Error	3,63
Observations	318,00
P-Value	0,00

Word Count		
Section	**Count**	**Cumulative**
Introduction	1164	1164
Social Mobility	3522	4686
Educational Inequality	2437	7123
Methodology	2274	9397
Results	1311	10,708
Discussion and Conclusion	2936	13,644
Footnotes	514	14,158
Total	14,158	