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Contents

Introduction

In both the United Kingdom and the United States, parents remain the primary determinants of which children prosper in adult life. The UK and US are arguably the two most advanced market-based economies in the world; yet they remain rooted at the bottom of international league tables for social mobility, at least when mobility is measured in terms of income or earnings. The latest comparisons suggest that American or British citizens are about as half as mobile as people in Finland or Denmark for example; that means they are twice as likely to stay in the same income bracket as their parents when they become adults. Income mobility in the US and UK is also significantly lower than in Canada and Australia, countries they otherwise share much in common with – economically, culturally and in the rich diversity of their populations[1].

These findings call into question one of the fundamental assumptions at the heart of American and British societies: that high income inequalities among people are acceptable as long as everyone has an equal opportunity to progress in life, through their own talents and hard work. Low social mobility levels reveal that those at the bottom of the income ladder in early life are far less likely to earn higher incomes as adults when compared with children from richer homes.

The idealized vision of education as a socio-economic leveler has so far failed to live up to the reality for the vast majority of children from less privileged backgrounds. Far from raising opportunities for all irrespective of background, the education system has served to perpetuate inequalities. For the fortunate few, education, and particularly higher education, can be a primary driver of upward mobility. Yet, the few talents from humble origins that do go onto to realize their potential often do so in spite of the system, not because of it. Not only is this unfair for individuals unlucky to find themselves on the bottom rungs of society; it represents a tragic waste of talent to the two economies in an increasingly competitive global economy.

Stark, persistent attainment gaps, widening from pre-birth to post graduation, characterise the 'land of opportunity' and its older cross-Atlantic cousin. Half of the social class attainment gap in the US is already present by the start of elementary school, and this disparity persists and widens throughout the education system. Just 11 percent of American children whose parents are among the lowest fifth of incomes have college degrees, compared with 53 per cent from families from the top fifth of incomes[2]. A similar educational divide – 10 percent of the poorest children in HE compared to 44 percent of the richest children – is evident in the UK[3].

Even starker gaps persist in the entry to the elite academic institutions in both countries; in the UK, less than one in five young degree entrants to leading research universities come from the four lower class groups that make up half the UK population[4].

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[1] For more details see Table 1 and Figure 1 in *How much can we learn from international comparisons of social mobility?* By Jo Blanden, in this volume.

[2] Current Population Survey, March Labor Force Supplement (March 2004); *"Tough Choices or Tough Times: The New Commission on the Skills of the American Workforce,"* released by the National Center on Education and the Economy in December 2006. p.6.

[3] *Recent Changes in Intergenerational Mobility in the UK,* Stephen Machin and Jo Blanden http://www.suttontrust.com/reports/Summary.pdf

[4] See http://www.suttontrust.com/reports/NCEE_interim_report.pdf

This is all the more concerning as education is now, perhaps more than ever, the gateway to better life prospects – distinguishing between the haves and have-nots in society. In the US, by 2004, wage declines among high school graduates with no post-secondary education placed this group for the first time below the middle 50 percent of family incomes (the middle class). Wage differentials based on educational attainment are growing starker. In the US in 1979, a male with a bachelor's degree could expect to earn 51 percent more during his lifetime than a peer with only a high school degree; by 2004, the difference had risen to 96 percent[5]. These trends are mirrored in the UK. And they have global implications: higher skills and knowledge are increasingly the most valued commodities in the world's rapidly evolving marketplace.

A recently published report by the management consulting firm, Mckinsey, quantified the economic costs of the achievement gap on the US[6]. The analysis suggested that if the gap between low-income students and the rest had been narrowed during the last decade, the national GDP in 2008 would have been $400 billion to $670 billion higher (or 3 to 5 percent of GDP). Put differently, the persistence of the gap imposes on the US the economic equivalent of a permanent national recession. While inevitably there are a number of assumptions made to reach such conclusions, the report provides a powerful reminder of the scale of the economic impact of educational underachievement.

One of the inspirations for organizing a joint UK-US summit on social mobility and education was that the UK and US share so many similar challenges. If anything, the economic crisis that has subsequently engulfed the world has only served to further emphasize the common issues the two nations face, and the critical role that education has to play in their economic vitality. The core question posed by the summit – how can education improve mobility levels – is arguably an even more pressing issue amid an economic recession that will particularly affect the lives of those on meagre incomes.

Parallels can also be found between the two countries in the reforms aimed at raising standards and improving education – so talent can be nurtured wherever it is found, and achievement gaps reduced. In the US, the Head Start programme provides early years support for pre-school children; in the UK this service is offered by the Sure Start scheme. For state funded but independently governed Charter schools in the US, read Academies in the UK. For No Child Left Behind in the US, read Every Child Matters in the UK.

In other ways, however, there are fundamental differences between the two countries. The British can only marvel at the diversity of education policies in different US states, which contrast with the largely national agenda in the UK. In the UK, national league tables published for schools have dominated the agenda in a way that would not be possible in the US. Meanwhile, the leading universities in the US and UK may vie for top places in the global academic rankings, but financially they could not be more different animals: the well endowed Ivy League institutions are

[5] Current Population Survey op. cit.

[6] 'The Economic Impact of the Achievement Gap in America's Schools' http://www.mckinsey.com/clientservice/socialsector/achievement_gap_report.pdf

free to charge students the tuition fees they want to, whereas even Oxford and Cambridge remain largely dependent on state support in the UK.

It was against this context that the aims of the summit were set. The central goal of the meeting was to review research and evidence relating to the UK and US and suggest educational policies and reforms most likely to support higher levels of social mobility in the two countries. A related question was to consider the mobility of an increasingly important group: the children of foreign born parents. The papers in this volume, authored by summit presenters, combine new research findings and data analysis with academic literature reviews and present findings for both countries.

International Social Mobility Trends

Jo Blanden's summary of social mobility levels across the world represents the most comprehensive survey to date documenting intergenerational mobility estimates – whether classified by social class, social status, income, or education-using observations and data from 65 countries[7].

A complex picture of mobility emerges, with different classifications used to measure mobility yielding different comparative standings. The UK lies towards the bottom of the income mobility league table for those born in the early 1960s but it appears more mobile when status is judged by social class. The US appears rather immobile by income and education measures while appearing much more mobile by measures of social class and status. Blanden's key point is that these apparently contradictory patterns are not inconsistent: citizens in the UK and US may well have relatively low prospects of climbing the income distribution, while at the same time experiencing better chances of changing social class status. This seems plausible given that the gaps between the wealthy and poor have widened within particular social class groupings in the US and UK. In comparison, most developing nations and southern European nations tend to have lower levels of mobility by these measures, while the Nordic countries tend to have higher levels of mobility.

Blanden's paper elucidates the nature of the association between income inequality and intergenerational mobility. This is an issue with fundamental policy implications. The basic tenet that underpins the market based economies of developed countries is that large inequalities in earnings are fair, as long as all have equal opportunities to work for and gain those higher earnings. The international figures that are available, however, point to an undeniable correlation between these two variables: countries with high inequality also generally exhibit low social mobility. What we do not know is whether high inequality measured in a given year actually causes (along with other drivers) the low social mobility rates over a lifetime.

[7] For the purposes of this paper, social class is defined by a set of broad occupational groupings. Social status, in contrast, is more directly defined by particular occupation, measured by creating an index of status levels associated with particular occupations and then matching this index to parent and child occupations across generations. For income to serve as an accurate measurement of social mobility it cannot be examined at a single point in time; instead, it must be analyzed and compared over a significant number of years to approximate lifetime income opportunity. Education is defined as the level and quality of educational attainment as compared across generations.

Critically, Blanden's analysis demonstrates that large income gaps among families during childhood are particularly linked with low social mobility rates in later life – whether defined in terms of social status or earnings. This finding indicates that low mobility rates are not simply due to people having further to climb to reach higher income positions in society as income inequalities widen, but rather that initial gaps persist from childhood to adulthood, suggesting systematic barriers.

It could be that, possibly, early income gaps diminish the opportunities of poorer children to rise up the income distribution later in life. This might be due to wealthier parents being able to provide their children advantages that less well-off parents cannot afford. As the paper concludes, we would only be able to determine whether widening gaps in earnings actually lead to lower mobility by tracking trends over time in different countries, while also considering other drivers such as education spending and returns to education. Some evidence on this has been published for the UK, documenting a fall in mobility at the same time as inequality widened. But the question remains as to how important income inequality is compared with other possible drivers (such as education) of mobility in the US, UK – and indeed other countries with higher mobility levels? Some next steps for researchers include mapping out overall mobility figures for different countries, and attainment gaps at different stages of children's lives, and relating these to public policies in those countries.

Early Years

The work for the summit by Jane Waldfogel and Elizabeth Washbrook represents a first step in the challenge to trace education inequalities for current generations of children and estimate the factors underpinning these gaps in different countries. The research exploits similar datasets gathered on the early years outcomes of children, the Millennium Cohort study in the UK and the Early Childhood Longitudinal Study – Birth Cohort in the US. The magnitude of early childhood inequality in the two countries has been well documented, with some estimates in the US apportioning half the entire attainment gap for pupils already present at the start of elementary school. This investigation was partly prompted by the question of whether these early inequalities are universal across different countries.

The answer at least for the US and UK is that the size of emerging gaps in test scores of offspring from different income groups reflects the distinctive spread of incomes in the two countries. For example, a much starker gap in literacy test scores exists in the US between children from families with the highest fifth of incomes and those from families with middle incomes. Yet it is also the case that the highest fifth of earners in the US are richer than highest fifth of earners in the UK, earning far more than middle income families. Larger gaps exist in the UK for vocabulary tests between children from families with middle incomes and those from families with lowest fifth of incomes. The middle income families are on average higher earners in the UK than their middle income counterparts on the other side of the Atlantic.

Waldfogel and Washbrook use the detailed cohort study data to decompose the gaps in school readiness between children from the bottom fifth and children from the middle fifth of the income distribution. For US children, parenting style emerges as the single largest factor, accounting for 19% of the gap in mathematics, 21% of the gap in literacy, and 33% of the gap in language. Aspects of home learning environment are the second most important set of factors, accounting for between 16 and 21% of the gap in cognitive school readiness between low-income children and their middle-income peers. A next step will be to investigate whether these factors similarly account for the early years gaps in the UK.

The authors identify an array of early childhood policy schemes that offer the potential to narrow early childhood inequalities. For example, high-quality home visiting or parent training programmes have been shown to be effective at providing parents with the tools to enable their children to develop and flourish in a healthy home learning environment. The most effective schemes often improve more than one set of factors. Some of the best parenting programmes also improve child health or maternal health behaviours. An alternative option is to focus on pre-school child care and education programmes, which can – if they are of sufficient quality – help to compensate for disadvantages in the home environment. Waldfogel and Washbrook suggest that an important exercise would be to undertake a cost-benefit analysis of these schemes, both in the short-run and in the longer-run. The benefits of such a review, amid a global economic recession, would be even more valuable.

Schools

While early years schemes show promise in narrowing early achievement gaps, the evidence shows that these gains will be lost unless interventions continue during the schooling years. The core challenge for schools – during the formative years for children from ages five to 18 – is to raise attainment to the highest levels among all children from poor and prosperous backgrounds alike.

Figures published by the National Assessment of Educational Progress, also known as the 'Nation's Report Card' in the US, point to stark gaps between advantaged and disadvantaged students. In 2003 for example, students in Fourth Grade (aged around 9) who were eligible for free lunch scored 22 points lower in Math than their peers who were not eligible for free lunch. By Eighth Grade, the gap remained roughly the same.

Brian Jacob and Jens Ludwig offer a wide-ranging review assessing the cost-effectiveness of various school policies that have been developed in the US to help narrow this attainment gap.

Jacob and Ludwig recommend policies that fall into the following major categories: the primary importance of hiring and effectively deploying high-quality teachers; rigorous accountability schemes; and systemic policy changes such as school choice and curricular and instructional interventions within schools. They encourage policies to expand Magnet and Charter schools that enjoy greater autonomy than other publicly funded schools in the US. Furthermore, they argue that there is enough persuasive evidence to suggest that financial incentives for high quality teachers could be deployed as a powerful tool in encouraging them to work with disadvantaged children.

The authors support policies that reduce class size particularly in early grades, as long as any reduction does not compromise teacher quality for each class. There is also evidence meanwhile that changing and improving the 'accountability' incentives which monitor student achievement in schools may raise standards for the most disadvantaged students. The key for accountability measures is that these must be designed intelligently to avoid unintended consequences within schools.

Reviewing UK school interventions, Sandra McNally meanwhile warns that moves to increase school choice for parents may exacerbate rather than mitigate social segregation and inequalities: poorer families, despite having choice in theory, still face obstacles in exercising choice which do not affect higher socio-economic families to the same extent. There is also good evidence from the UK that higher pay for head teachers leads to better school performance. McNally argues that the first priority, at least in the UK, should be to collect more data on teacher records, classes taught, and student achievement, to better assess the impact of different teachers.

Higher Education

Echoing earlier education inequalities, the increased university or collegiate enrolment during recent decades in the US and UK has not produced correspondingly broad increases in attainment for students from all socio-economic backgrounds, documents Sarah Turner in a review of higher education participation trends.

That the gaps in HE attainment are so similar in the US and UK is all the more striking given the radical differences in the applications systems and student fees in the two countries – a sure sign perhaps that attainment gaps in schooling are the main drivers of differences in higher education participation rates.

Policy debate on this issue tends to flip between two extremes: focusing attention exclusively on narrowing pre-achievement gaps before university, or raising concerns over 'credit constraints' preventing poor students applying to university. Turner makes the key point that this is a false dichotomy: credit constraints play the most significant role in limiting college choice rather than affecting HE enrolment. In charting the low uptake of well qualified students from less privileged backgrounds to elite institutions in the US, Turner finds that for some students, the cost of full-time attendance may be difficult to finance given the current availability of loans and grants, outside the few institutions that are able to provide full need-based aid. As a result, relatively high achieving low-income students appear appreciably more likely than their more affluent peers to "mismatch" in initial college selection.

The participation patterns in the low fees regime in the UK are perhaps more nuanced than this, suggests a parallel analysis by Anna Vignoles. Pupils with the appropriate A-level grades stand a similar chance of ending up at an elite university in the UK if they were eligible for free school meals or not. Other studies however have suggested that highly qualified state pupils are less likely to enrol at elite universities as their independent school counterparts. But it may be that credit

constraints become more of an issue for elite university enrolments if university fees, at least in England, increase further – as is likely in the near future.

Turner argues that it is neither possible nor efficient for universities to eliminate fully the entrenched inequalities apparent at the time of college entry. Yet, given the increasingly impact that higher education has on future earnings and job opportunities, there is an increasingly urgent need to ensure that colleges and universities provide genuine equality of opportunity.

Mobility of Second Generation Immigrants

The final paper of the summit, by Demetrios Papademetriou and Will Somerville, examines mobility levels of immigrants and their children in the US and the UK.

Both countries are experiencing rapidly demographic change. In the US by 2010, if not before, one in four of all children under the age of 18 will be the children of immigrants. For the UK, second generation immigrants under the age of 18 will exceed one in five of all children by 2013. Immigrant students often perform at levels significantly lower than their native peers. According to the OECD 'at least 25% of immigrant students could face considerable challenges in their future professional and personal lives as they do not demonstrate basic mathematics skills' for example.

Research suggests that second generation immigrants in the US improve on the socio-economic position of their parents, as their relative wages are about 5 to 10 percent higher those of first generation immigrants. The major caveat to such findings, however, is that different immigrant groups come from radically different starting points. Overall, the authors find that immigrants still have a lower degree of intergenerational earnings mobility than natives, with one estimate suggesting that today's second generation immigrants will experience a 10-15 percent wage disadvantage in 2030. The findings for immigrants in the UK are not dissimilar, though there may be more positive outcomes associated with certain groups.

A key message in fact from the paper is that broad generalizations about the life prospects of second generation immigrants should be avoided: there is a complex set of factors – from discrimination, language acquisition to social networks – that impact the lives of particular minority groups. The authors suggest a number of possible research avenues, including for example comparing how particular immigrant groups fare in different countries -perhaps considering immigrants from Ireland, India, China or the Caribbean. Another possibility would be to do city-to-city comparisons in the US and the UK.

Arguing that education is the main determinant of mobility, the authors put forward a number of education policies that would improve the outcomes of second generation immigrants. Increased continuity between early childhood and primary school could have a significant impact on performance of immigrant children, for example. There are several options for improving the situation of second-generation children through school-age interventions. One intervention would be to lower the compulsory schooling age as a way of promoting language acquisition. Another would be to create second chances to help students overcome disadvantages. Moreover, there is a

broad need to support more integrative policies that improve the social capital of immigrants along with other disadvantaged groups.

Concluding Remarks

The economic downturn that has reverberated around the world since the summit has in many ways reinforced the similarities between the US and UK. The challenge facing the new US Administration and the UK Government is now even more stark: how to prioritise the education policies that will raise standards for less advantaged children given the constraints of a fixed education budget for the forseeable future. What should the priorities for funding be?

This is ultimately a political decision, but the summit papers provide ample evidence that will help to inform these difficult choices. An obvious next step would be to assess the cost-effectiveness of different approaches. Social mobility levels, already low in these two countries, are now coupled with increasing economic insecurity. As both countries attempt to move toward recovery, the need for high quality education for children from all backgrounds becomes ever more urgent. That education has transformed the lives of some children from disadvantaged backgrounds makes all the more compelling case for reforming the education system so that prospects are raised for all students.

Inevitably, the evidence gathered in this volume prompts many research and policy questions. The experience of countries such as Australia and Canada, with higher mobility rates but also relatively high income inequality, could provide informative comparatives. Are these education systems outside the UK and US providing opportunities for children from a broader range of family backgrounds? One obstacle to such enticing international comparisons is obvious: paucity of robust, comparable data. But data is now increasingly available for a range of developed nations, with diverse education policies and contrasting income inequalities.

A clear benefit of the summit, which will not be apparent from the papers themselves, was simply bringing together leading researchers and top-level policy makers and politicians from two different countries into the same room together for two days. Many collaborations were born during the meeting in New York – bridging different academic disciplines, the policy-research divide, and national boundaries. Often it is the meeting of different perspectives that ignite the most insightful and open-minded debate. Too often the worlds of education policy and research operate in parallel universes, with little interaction; internally focused national discussions always run the risk of becoming mired in parochial or historical concerns.

The Sutton Trust is hugely thankful to the authors of the summit papers, for igniting the most insightful and open-minded debate. We are also indebted to our partner, Carnegie Corporation of New York, without whose support this meeting of cross Atlantic minds would not have been possible.

How much can we learn from international comparisons of social mobility?

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Abstract

This paper summarises research on the relative level of intergenerational social mobility – whether classified by income, social class, social status or education – considering observations from 65 countries. The figures for income, status and educational mobility in reveal similar patterns, with South America, other developing nations, southern European countries and France tending to have rather limited mobility by all measures. The Nordic countries exhibit consistently high mobility. Evidence for the US and Germany differs across the measures, with Germany immobile on education and class and fairly mobile on income and the reverse true for the US. These differences are likely explained by greater within-group income inequality and persistence in the US. The second part of the paper finds that mobility is negatively correlated with inequality and the returns to education and positively correlated with a nation's education spending.

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1. Introduction

Intergenerational mobility is concerned with the relationship between the socio-economic status of parents and the socio-economic outcomes of their children as adults. This can be measured in a variety of ways, by income and earnings, social class or status, or education. If an individual's income/social class/education is strongly related to his or her parental background, this means that a child from a poor family is unlikely to escape his or her start in life and consequently inequality will perpetuate. This has implications for economic efficiency if the talents of those from poorer families are under-developed or not fully utilized, as those from poorer backgrounds will not live up to their productive potential.

Most people would agree that equality of opportunity is an important goal; nonetheless it is difficult to imagine a world with no link between outcomes across generations. Genetic transmissions alone are likely to lead to a positive association between the educational achievements, career prospects and earning power of parents and children, while learning within the family will lead to children from better-off families being better equipped to succeed. Hence the policy implications of the study of intergenerational mobility are unclear. If intergenerational income inequality is solely a consequence of the automatic transmissions of ability and other attributes within the family, its reduction would require strong intervention by the state, and might lead to inefficiency. Our understanding of this can be improved by making comparisons of the levels of intergenerational mobility across countries. With comparisons in hand, it is possible to assess mobility as 'relatively weak' and 'relatively strong', and then begin to consider potential explanations for differences in intergenerational mobility.

The first task in this paper is to summarise the literature on the relative strength of social mobility across different countries. In contrast to most other summaries, work on income, social class, social status and education will all be considered with observations of mobility included from 65 countries. If our question of interest is 'How does the importance of the influence of parental background for children's outcomes differ across countries?' it does not seem reasonable to concentrate only on one measure of background and outcome. In addition we know there is a great deal of uncertainty about comparisons made on the basis of the income mobility literature (as highlighted in Björklund and Jäntti, 2008). It would therefore be helpful to look at how estimates compare across different literatures. We find that the different measures used tend to be fairly well correlated, with South America and southern Europe having low mobility and the Nordic nations being rather more mobile. Measures of the association of social class across generations (social class fluidity) are the exception to this, with if anything, a negative relationship between the country rankings on these measures and others.

In the second part of the paper we begin with a short review of the theoretical literature that seeks to model the determinants of intergenerational mobility within society. This includes income inequality, educational investment, and returns to education. Finally we take our preferred measures of mobility and correlate them with these variables paying particular attention to

contrasting results from our measures of income, educational and occupational mobility. We find evidence that income, status and educational mobility are all related to inequality, education spending and the returns to education.

These descriptive correlations cannot be thought of as painting a picture of the causal relationships that drive intergenerational mobility. However, owing to the intense interest in the relationship between inequality and immobility, it seems worthwhile to explore the extent of our knowledge in this area. In the conclusions remarks are made about the policy implications of the results presented here and we are also careful to discuss the further evidence required to make more concrete suggestions about how public policy could be used to promote mobility.

2. Measures and Concepts

2.1 Income Mobility

Measures of intergenerational earnings and income mobility are based on estimation of β in the following model:

$$\ln Y_i^{child} = \alpha + \beta \ln Y_i^{parents} + \delta age_i^{parents} + \gamma age_i^{child} + \varepsilon_i \quad (1)$$

where $\ln Y_i^{child}$ is the log of some measure of earnings or income for adult children, and $\ln Y_i^{parents}$ is the log of income or earnings for parents, i identifies the family to which parents and children belong and ε_i is an error term. β is therefore the average elasticity of children's income with respect to their parents' income.

Hypothetically, $\beta=0$ represents a case of complete mobility where the incomes of parents and children are completely unrelated, $\beta=1$ and represents a case of complete immobility where the proportionate earnings advantage of parents is precisely mirrored in their children's generation. Estimates of β tend to lie between 0 and 1, implying that an initial income advantage will be wiped out over several generations.

Intergenerational mobility can also be measured by the partial correlation of parents' and children's incomes. This adjusts for differences in income variance between the two generations. Mobility can be thought of as measured by 1- r.

$$r = \mathrm{Corr}_{\ln Y^{parents},\, \ln Y^{child}} = \beta\left(\frac{SD^{\ln Y^{parents}|age}}{SD^{\ln Y^{child}|age}}\right) \quad (2)$$

Economic mobility can be measured either through income or earnings; in reality, the literature is dominated by estimates of the elasticity of sons' earnings with respect to fathers' earnings. This means that the importance of non-labour income is not acknowledged, those without paid employment are dropped and that the experience of women as both mothers and daughters has been frequently neglected (Chadwick and Solon, 2002, is a notable exception regarding

daughters). As this paper is seeking comparable measures of mobility we also focus on the earnings mobility of men, but this does not mean that other measures are uninteresting, and they certainly deserve more widespread attention.

Models of intergenerational persistence[1] tend to imply that the measurement of intergenerational mobility should be based on the permanent income of parents and children; unfortunately in datasets where incomes of both generations are available they are often only short-term measures. Under classical measurement error assumptions[2] it is straightforward to show that measurement error in the dependent variable (the child's income) will not bias the estimate of β, although it will lead to a loss of precision and larger standard errors. As discussed by Solon (1992) and Zimmerman (1992), measurement error in the explanatory variable has more serious implications and will lead to inconsistent estimates of β. Indeed, the estimated parameter, $\hat{\beta}$, will be an underestimate of the true β, as shown in equation (3), where σ_y^2 and σ_u^2 are the variances of fathers' permanent income and the error, respectively.

$$p\lim\hat{\beta} = \beta\frac{\sigma_y^2}{\sigma_y^2+\sigma_u^2} \tag{3}$$

It is clear that the 'signal to noise' ratio ($\frac{\sigma_y^2}{\sigma_y^2+\sigma_u^2}$) is crucial to obtaining accurate estimates of intergenerational persistence. If the variance of the error contained in parents measured income is small compared to the true variance of permanent income, then $\hat{\beta}$ will be close to β and we will have a good estimate of intergenerational persistence.

One strategy for reducing the downward bias associated with measurement error is to average parental income over several periods to come closer to a measure of permanent income. Under the classical measurement error model there will be a fall in the attenuating factor as more periods of data are used to generate the average, as shown in equation (4). As T approaches infinity, will $\frac{\sigma_u^2}{T}$ converge to zero and $\hat{\beta}$ will approach the true value of β.

$$p\lim\hat{\beta} = \beta\frac{\sigma_y^2}{\sigma_y^2+\sigma_u^2} \tag{4}$$

Work by Mazumder (2005) has shown that Solon's approach to solving measurement error by averaging parental income over five years or so may not be sufficient to overcoming measurement error as the observations used are generally too close together to be truly representative of lifecycle income.

[1] See Goldberger (1989) for a discussion of how transmissions of endowments lead to intergenerational persistence and Solon (2004) for a model based on parental investments. Both lead us to expect that permanent income is the relevant concept.

[2] These assumptions are that the level of y_i is uncorrelated with the size of the measurement error, and that errors are uncorrelated across generations.

This topic is taken up in a rigorous way by Haider and Solon (2006). The starting point of their article is that the classical measurement error formulation is inappropriate as the relationship between permanent income and current income varies through the lifecycle.[3] As described by Mincer (1974), age–earnings profiles are steeper for those with more human capital (higher permanent incomes). Hence, at young ages current income is low compared to permanent income for those with high permanent income, while at older ages current income is higher compared to permanent income for those with high permanent income.

Haider and Solon (2006) show that with this type of measurement error the direction of the bias is determined by the age at which earnings are observed. In addition, and unlike the classical case, measurement error in the dependent variable (children's incomes) will have an impact. The data used for intergenerational mobility often focuses on young sons and older fathers. Haider and Solon show that this combination is likely to lead to downward bias through both the dependent variable and the explanatory variables, and possibly to substantial underestimation. To minimize the extent of measurement error, incomes for both generations should be taken at the point when they are most representative of permanent income. Haider and Solon (2006) estimate this to occur at around the age of 42. Reville's (1995) empirical results support Haider and Solon's hypotheses. He finds evidence that $\hat{\beta}$ rises substantially with the age at which sons' earnings are observed, particularly between ages 27 and 31.

An alternative solution to the classical measurement error problem is to use instrumental variables (IV). A valid IV is correlated with fathers' permanent income but uncorrelated with measurement error. In addition it should not independently affect children's economic status. The obstacle to using instrumental variables in this context is that almost every variable that is correlated with parents' permanent income might also have an independent impact on sons' status. This leads to an unambiguous upward bias in IV estimates of intergenerational mobility, meaning that they tend to provide an upper bound on the true extent of intergenerational mobility in a country.

The number of nations for which intergenerational mobility can be estimated is severely limited by the data requirements. In order to use the traditional approach as described so far longitudinal information must be available for parental incomes and then children's incomes twenty or thirty years down the line. Clearly this is a substantial and long-term data collection exercise. Björklund and Jäntti (1997) use a variation of the instrumental variables technique to overcome this problem for Sweden in a way that has become increasingly popular and has enabled a large expansion in the number of countries for which we have information on intergenerational income mobility.
The Two-Stage Instrumental Variable approach (TSIV) is used when researchers have matched information on sons' earnings and fathers' characteristics (such as education and occupation) but no information on fathers' earnings. Fathers' earnings during the child's teenage years are predicted using information on the relationship between earnings and education from other data.

[3] Haider and Solon's paper has been followed up by Böhlmark and Lindquist (2006) using Swedish tax register data. The Swedish authors find that the broad patterns found for the US also hold in Sweden.

Sons' earnings were then regressed upon this prediction. Subject to certain assumptions, this estimator will be upward biased in the same way as other IV estimators. As discussed by Ermisch and Nicoletti (2007) the extent of the bias will depend upon the degree to which the instruments are directly related to the child's income and the strength of their ability to predict father's earnings. The larger the R-squared in the first-stage regression the smaller the bias will be. More recently this approach has been extended to Italy (Mocetti, 2007, Piraino, 2007), France (LeFranc and Tannoy, 2005) and in the international comparison by Andrews and Leigh (2008).

In making international comparisons of intergenerational income mobility it is therefore essential to take account of the issues highlighted above; the approach taken to measurement error and the age of the fathers and children when earnings are measured.

2.2 Socio-Economic Mobility and Social Class Fluidity

Measuring mobility by the statistical association of income or earnings across generations is actually a rather recent literature, with the majority of breakthroughs occurring since 1990. Much more established is the measurement of mobility by the links between social class or occupational status of fathers and sons.

One advantage of measuring intergenerational mobility by class or occupation is that the data restrictions are much less stringent, retrospective information on father's occupation is not difficult to collect and does not require the investment in longitudinal data necessary for intergenerational income studies. We may also think that occupation, broadly defined, varies less over the lifecycle making age–related biases less problematic. However, the difficulty with making international comparisons of mobility in social class or occupation across generations is the need for the measures to be comparable. This is a huge undertaking and has led to some large scale international projects and considerable controversy within the sociology discipline.

One approach to measuring mobility taken by sociologists is to create an index of socio-economic status (SEI) associated with occupations, match this index to fathers' and sons' occupations and then associate this index across generations. Generally the index depends on a weighted contribution of the average income and education within an occupation (where weightings are chosen to maximise the relationship between the index and the education and earnings of occupations). Ganzeboom and Treiman (1996, 2003) have worked extensively on applying this approach across countries and we discuss some of their results below. These socio-economic indices can be correlated across generations using similar approaches to those reviewed in the measurement of income mobility. The strength of these correlations can then be compared across countries. The raw correlations are often not the focus of papers; this data is more commonly used in structural models that distinguish the degree to which the child's education acts as a transmission mechanism for parent and child socio-economic status. Another approach, as in Ganzeboom and Treiman (2007), is to use the correlations as explanatory variables in a structural panel model which seeks to explain why social mobility varies across nations and time.

An alternative approach to measuring mobility is based on class. Class divisions are also based on occupation but are formed of broad occupational groupings, which are supposedly un-ordered. For example, a frequently used schema is based on Erikson et al (1979).

I + II Service class	Professionals, administrators and managers; higher-grade technicians; supervisors of non-manual workers
III Routine non-manual workers	Routine non-manual employees in administration and commerce; sales personnel; other rank-and-file service workers
IVa + b Petty bourgeoisie	Small proprietors and artisans, etc., with and without employees
IVc Farmers	Farmers, small holders and other self-employed workers in primary production
V + VI Skilled workers	Lower-grade technicians; supervisors of manual workers; skilled manual workers
VIIa Non-skilled workers	Semi- and unskilled manual workers (not in agriculture, etc.)
VIIb Agricultural labourers	Agricultural and other workers in primary production

As social class is not a continuous variable, the measurement of social class fluidity (as it is commonly called) is based on the analysis of two-way contingency tables which document the moves between classes across generations. Modelling the patterns of mobility in contingency tables is a more difficult enterprise than correlating continuous variables and a large literature has evolved on how this can best be achieved. The major difficulty stems from the fact that structural class shifts between generations will necessarily force some families away from the diagonal; increasing the appearance of absolute mobility. As a consequence it is important to have a measure of relative mobility which is invariant to compositional changes across generations.

Relative mobility is defined in terms of the odds ratios. For a 2x2 contingency table this is

$(\frac{F_{11} \times F_{22}}{F_{12} \times F_{21}})$ where F_{ij} is the frequency of observations in cell $_{ij}$ where i and j index father and son's classes respectively. Each set of four cells in the contingency table will generate an odds ratio, taken together these provide a complete description of the patterns of mobility in the data. Log linear models provide a more parsimonious way of describing the total pattern of mobility in a contingency table.

If we take as the dependent variable F_{ij} then this can be explained by a scaling parameter μ, the influence of the origin class τ_i, the influence of the destination class, τ_j and the influence of the association between origins and destinations for this particular cell, τ_{ij}.
So that $F_{ij} = \mu\tau_i\tau_j\tau_{ij}$ for all i and j.

If we take logs of this model it becomes linear

$$\ln F_{ij} = \lambda + \lambda_i^O + \lambda_j^D + \lambda_{ij}^{OD} \qquad (5)$$

In this way the model is fully saturated by the inclusion of origin (superscript O), destination (superscript D) and full interaction effects (OD), so the frequencies in each cell will be predicted perfectly. In a model of perfect relative mobility the λ_{ij}^{OD} terms will be equal to zero. The aim of log linear modelling is to avoid including all the λ_{ij}^{OD} terms but still achieve an acceptable fit for the model. The λ_{ij}^{OD} terms omitted depends on the particular pattern of mobility the researcher has in mind, models depicting different mobility schemes can be evaluated depending on how well they fit the observed data. For more detail on the precise nature of these models see Erikson and Goldthorpe (1992) or Breen (2004).

When a cross country approach is taken a third dimension is added to the model, k. If the researcher believes that association effects are common across countries the log linear model becomes.

$$\ln F_{ij} = \lambda + \lambda_i^O + \lambda_j^D + \lambda_k^C + \lambda_{ik}^{OC} + \lambda_{jk}^{DC} + \lambda_{ij}^{OD} \quad (6)$$

A way of measuring variations in fluidity across nations is to examine how well this model performs; if it provides a good fit then this indicates that variation in the extent of class associations across countries is limited. Models allowing variations in the extent of particular origin-destination effects across countries enable a more complex pattern of similarities and differences to be built up.

Erikson and Goldthorpe's book *The Constant Flux* compared the extent of class fluidity for a number of countries in the late 1960s and early 1970s. The study initially concentrated on Europe with England and Wales, France, Northern Ireland, Scotland, the Republic of Ireland, West Germany, Sweden, Poland, and Hungary all examined closely. Analysis was also added for Czechoslovakia, Italy, the Netherlands the United States, Australia, and Japan. More recently Breen (2004) has followed up this study with an analysis of 11 countries, with significant overlap with those included by Erikson and Goldthorpe, Breen's aim is to understand trends in mobility for these countries from the 1970s onwards.

The models estimated in both of these books produce a very large number of parameters, and a great deal of detail on changing mobility patterns. For the purpose of this summary we would benefit greatly from a single mobility parameter for each nation and point in time.
Erikson and Goldthorpe's (1992) UniDiff model provides such a statistic.

$$\ln F_{ij} = \lambda + \lambda_i^O + \lambda_j^D + \lambda_k^C + \lambda_{ik}^{OC} + \lambda_{jk}^{DC} + \lambda_{ij}^{OD} \quad (7)$$

X_{ij} depicts some general pattern of mobility and the coefficient β_k indicates how the strength of the association varies across countries. β_k is normalised to some baseline so that a relatively high β_k indicates relatively low mobility and a low β_k indicates high mobility.

This has necessarily been a very brief introduction to measuring social class fluidity. However it should hopefully give some intuition about the processes involved in the complex world of log linear modelling, and give an idea of how these methods have been used to draw comparisons across countries.

2.3 Educational Persistence across Generations

An alternative measure of mobility is the extent to which parents and children's education are related. The literatures on intergenerational income and social class or status persistence emphasise the role of education as a transmission mechanism; it seems natural to measure this association directly.

As with occupation, information on educational achievements across generations is quite widely available. Once again there are difficulties in ensuring that education has the same meaning across countries. One approach is to measure education in years of schooling, assuming that the meaning of this variable is constant across nations and generations. In this case educational persistence can be measured using the intergenerational coefficient and correlation, similar to the approach used for income mobility.

$$YearsEd_i^{children} = \pi + \psi YearsEd_i^{parents} + u_i \tag{8}$$

and $$\text{Corr}_{\text{YearsEd}^{\text{parents}},\ \text{YearsEd}^{\text{child}}} = \psi\left(\frac{SD^{YearsEd^{parents}}}{SD^{YearsEd^{child}}}\right) \tag{9}$$

Cross national comparisons and 50 year trends in the coefficient and correlation of years of schooling have recently been presented by Hertz et al (2007) for 42 nations. We will draw heavily on this work when we come to summarise the international findings.

The above approach assumes (as does the measurement of income mobility, as presented here) that the impact of years of education on the next generation is linear and monotonic. It seems unlikely that this will be true, and even more unlikely that this will be true in all countries. As an example, the structure of the UK schooling system means that it is inappropriate to estimate simple years of schooling effects here (Dearden et al, 2002). To overcome this problem we might wish to consider education in terms of qualification levels. This is more demanding in terms of cross-national comparability. Chevalier et al (2008) use the UNESCO designed ISCED classification as the basis of the five-category coding of education to measure the intergenerational association of education in Europe and the US.

Using a categorical measure raises difficulties of the type faced in the social class fluidity literature: how can we measure associations in education across generations as successive generations become more educated? The approach taken to this question by Chevalier et al is to model the associations in education by two measures; the eigen value index which summarises the degree of mobility implicit in a transition matrix – how rapidly parental education origin is forgotten – and the Bartholomew index which computes the average number of categories moved between generations.[4] Denny et al find a relatively weak correlation between these two measures. It seems

[4] *Eigen–value–index* $\equiv 1-|\lambda_2|$
where λ_2 is the second largest eigen value, the largest eigen value of any transition matrix is one. If λ_2 is equal to zero then the transition matrix equals to the limiting invariant matrix and corresponds to equality of opportunity.

$B \equiv \sum_i \sum_j f_{ij}|i-j$

that the modelling approach taken to education persistence matters. We will consider in more detail how different measures change country rankings in Section 3.

2.4 Conceptual links across the measures

Taking first the relationship between income and education measures of mobility.
Recall the linear model of intergenerational income mobility (omitting age controls):

$$\ln Y_{ik}^{children} = \alpha_k + \beta_k \ln Y_{ik}^{parents} + \varepsilon_{ik} \tag{10}$$

where the subscript k indicates that the mobility relationship varies across countries.
In each generation education has a return in the labour market so that

$$\ln Y_{ik}^{children} = \alpha_k + \beta_k \ln Y_{ik}^{parents} + \varepsilon_{ik} \tag{11}$$

and $\ln Y_{ij}^{child} = \alpha_{2k} + \phi_k^{child} Ed_{ik}^{child} + u_{ik}$. (12)

ψ_k is a linear measure of the persistence of education across generations. It can be easily be shown that the relationship between β_k and γ_k is:

$$\beta_k = \frac{\phi_k^{child}}{\phi_k^{parents}}\psi_k + \frac{\phi_k^{child} Cov(Ed_{ik}^{child}, v_{ik})}{Var(v_{ik})} + \frac{1}{\phi_k^{parents}} \cdot \frac{Cov(u_{ik}, Ed_{ik}^{parents})}{Var(Ed_{ik}^{parents})} + \frac{Cov(u_{ik}, v_{ik})}{Var(v_{ik})} \tag{13}$$

The first term gives the relationship between intergenerational mobility in income and earnings if education were the only route for intergenerational transmission. In this case the relationship between the two would be moderated by the relative size of returns to education, if returns to education increase across generations then income persistence will be higher than educational persistence and vice versa. The second term is the impact of the relationship between parental income (orthogonal to education) and child's education while the third term is the other cross effect between parental education and the child's residual earnings. The final component shows the relationship across generations of those components of earnings/income that are independent of education. It is clear that while income and education persistence are likely to have a positive correlation there are many other components which will lead to this correlation being less than one. One important element of this is the extent to which parental income and education influence u_{ik} , which can the thought of as the within-education inequality in income.

It is easy to see how the above equation could be modified to express the relationship between socio-economic status mobility and income mobility, with ψ_k instead indicating the association

fij is the joint frequency in the i, jth cell of the transition index and the modulus of (i-j) is the number of changes in education level made from one generation to the next. In essence it is summarizing how far th population is from the principal diagonal of the matrix.

between status and the ϕ_k terms giving the income return to status. Björklund and Jäntti (2000) assert that differences in the extent of mobility by income and social class can be explained by the extent of inequality; the US is rather immobile on measures of income persistence, but rather more mobile in terms of class fluidity, the difference can be explained by the extent of income mobility, we shall return to this argument below. Blanden, Gregg and Macmillan (2008) make a similar argument about the relationship between social class fluidity and income mobility in the UK; asserting that the transmission of income inequality within classes is essential to explaining differences in results across approaches.

3. Is there a consensus?

3.1 Income Mobility

The comparison of intergenerational income elasticities has become a reasonably well worn path, with studies by Solon (2002) Corak (2006) d'Annio (2007) and Björklund and Jäntti (2008) all seeking to draw together the international evidence on mobility. The introduction to income mobility provided in Section 2 has outlined the crucial measurement issues which can cause estimates of income mobility to be biased. It is essential that the estimates of mobility chosen for different countries are similar in their approach to measurement error and the age at which income is measured for each generation. In addition, as income mobility may change over time it is important that comparisons are made for cohorts as close in birth date as possible. My preferred estimates are for cohorts born in the late 1950s or early 1960s and I consider the relationship between the earnings of fathers and sons.

The selected estimates are listed in Table 1. They are based on two techniques, OLS using a time average of fathers earnings (based on around 5 years of data) and TSIV where fathers' earnings are predicted on the basis of his other characteristics. As discussed in the methodology section, we would expect the TSIV estimates to be upward biased compared to those based on OLS. In this revision of the paper I follow Corak (2006) in scaling down the TSIV estimates to make them more comparable. This is done on the basis of the bias detected in Solon (1992) and Björklund and Jäntti (1997), in both cases the OLS estimates based on the US PSID are smaller than those based on IV approaches by a factor of 0.75. This is only a rough estimate of the likely bias in other countries, but seems preferable to leaving the estimates uncorrected.

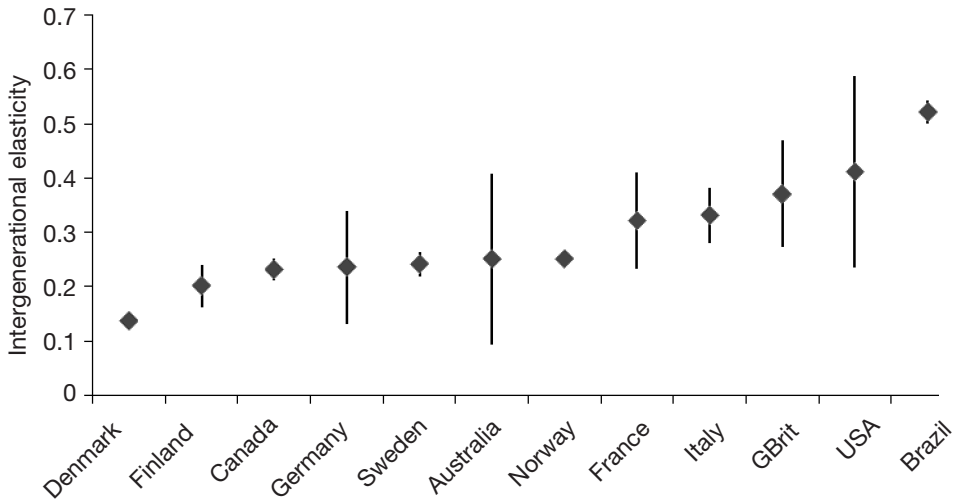
For the UK Dearden, Machin and Reed (1997) uses IV approaches for the 1958 cohort to get an estimate of 0.58, this is scaled down to give 0.435, however this is extremely high compared to the estimate from the British Household Panel Study given in Ermisch and Nicoletti (2007), which is 0.29 for the relevant cohort. In order to recognise the fact that 'There is a lot of uncertainty about the UK' (Björklund and Jäntti, 2008) we average the two estimates to give our preferred figure. This is in contrast to other surveys; Solon (2002) and Corak (2002) rely exclusively on Dearden, Machin and Reed, while Björklund and Jäntti (2008) prefer Ermisch and Nicoletti's estimate.

Table 1: Preferred estimates of income mobility

Country	Source	Elasticity
Brazil	Dunn (2007) (scaled)	0.52 (0.011)
US	Solon (1992)	0.41 (0.09)
UK	Dearden, Machin and Reed (1997) (scaled) and averaged with Nicoletti and Ermisch (2007)	0.37 (0.05)
Italy	Piraino (2007) (scaled)	0.33 (0.026)
France	Lefranc and Tannoy (2005) (scaled)	0.32 (0.045)
Norway	Nilsen et al (2008)	0.25 (0.006)
Australia	Leigh (2007a) revised as in Björklund and Jäntti (2008)	0.25 (.080)
Germany	Vogel (2006)	0.24 (.053)
Sweden	Björklund and Chadwick (2003)	0.24 (0.011)
Canada	Corak and Heisz (1999)	0.23 (0.01)
Finland	Pekkarinen et al. (2006) Österbacka (2001) Averaged as in Björklund and Jäntti (2008)	0.20 (.020)
Denmark	Munk et al (2008)	0.14 (0.004)

Note: Estimates based on two-stage instrumental variables regressions are scaled down by 0.75 to allow a legitimate comparison to be made with those based on OLS and time averaging. This reflects the difference in these estimates found for the US in Solon (1992) and Björklund and Jäntti (1997).

Figure 1: Preferred Intergenerational Income Parameters



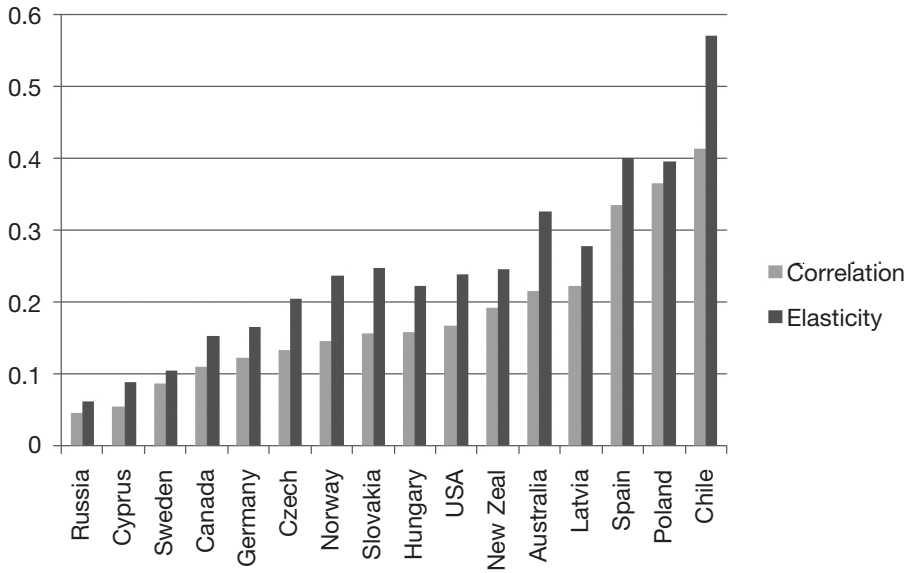
Sources for these estimates are listed in Table 1 and Appendix Table 1. Lines give 95% confidence intervals.

Figure 1 provides a visual comparison of our preferred estimates of intergenerational income persistence. There are 12 countries represented, and as we shall see this is small compared to the number of countries for which there is information on education and status mobility. While it is tempting to immediately form the estimates into a 'league table' we must pay attention to the size of the standard errors; these are large in many cases. Although it does seem to be the case that the Nordic nations have higher mobility, it is impossible to statistically distinguish the estimates for Sweden and the US. The appropriate ranking at the top end is difficult with large standard errors on the Australian, French, British and US estimates making it unclear how these countries should be ranked.

Brazil sticks out clearly at the top of the graph as having low mobility (which is quite precisely measured). This is our first evidence that they may be stark differences between estimates of mobility for developed and developing countries or across different regions of the world. Grawe (2004) considers mobility for a broader range of countries and finds persistence in Ecuador, in particular, to be far higher than any estimate for developed countries.

The study by Andrews and Leigh (forthcoming) provides estimates of mobility for 15 nations using a TSIV methodology with the explicit purpose of considering the relationship between mobility and inequality. In this study Andrews and Leigh report both intergenerational elasticities and correlations and we use these to supplement the picture painted in Figure 1 (few of the studies used in Table 1 also report correlations). Figure 2 shows the estimates of mobility from this study.

Figure 2: Intergenerational income elasticities and correlations from Andrews and Leigh (2008)



Source: Table A1 in Andrews and Leigh (2008)

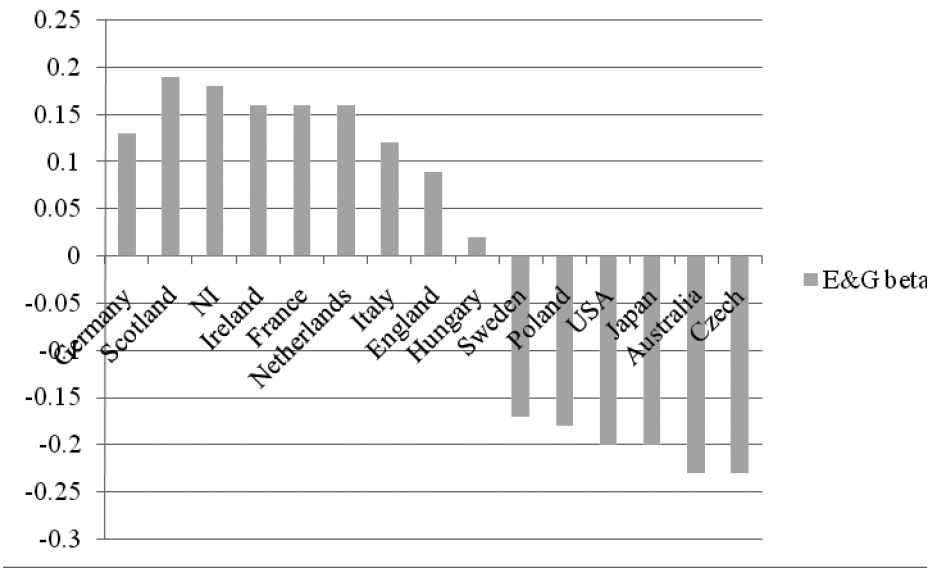
The set of countries considered here is rather different from those in Figure 1, but there is some similarity in the ranking, Sweden, Canada and Germany are fairly mobile, and the South American country included, Chile, is highly immobile. There is however some changing of the ordering of countries with the US appearing slightly more mobile than Australia. Overall the figures in Figure 1 are preferred as they are based on an extensive literature review, but the information from Andrews and Leigh is a useful robustness check providing information on more countries as well as measures of the intergenerational correlation.[5]

3.2 Social Status and Class Fluidity

Erikson and Goldthorpe (1992) provided an analysis of international comparisons of social class fluidity for the 1970s which has been recently updated in Breen (2004). The discussion of cross national similarities and differences in both Erikson and Goldthorpe (1992) and Breen (2004) is incredibly rich with a great deal of detail concerning the extent of mobility between particular classes.

Both studies also provide summary measures from the UniDiff model. These are included here in Figures 3 and 4. In the earlier study the average extent of mobility is normed to 0 while in Breen this normalisation is on 1. Our discussion of mobility so far has indicated notable differences

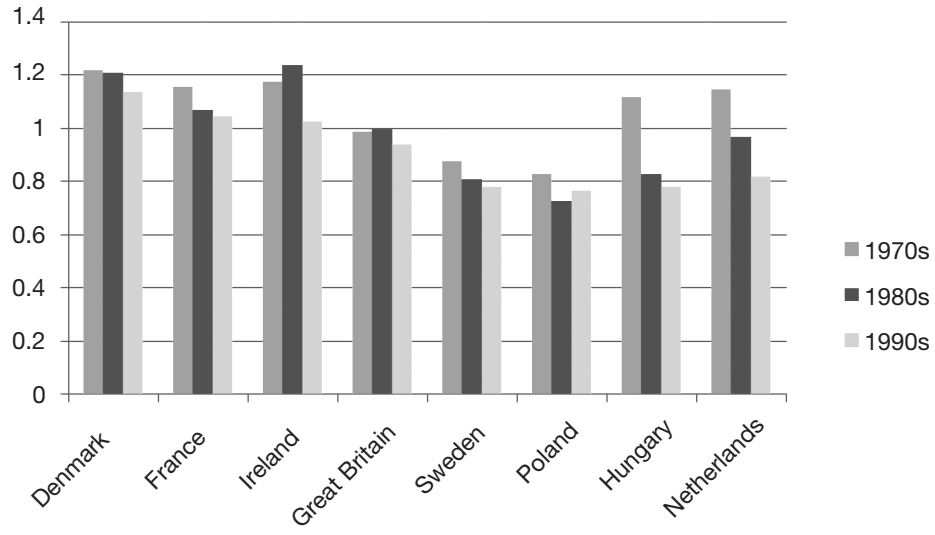
Figure 3: Parameters from Erikson and Goldthorpe Social Class Fluidity Model



Source: Erikson and Goldthorpe (1992) Table 11.1

[5] The TSIV estimations in this paper are based on finely graded occupation. This means that the estimations obtained will lie somewhere between a pure income and a social status approach. Differences in rankings between Figures 1 and 2 can be interpreted in this light.

Figure 4: Parameters from Social Class Fluidity Model



Source: Breen (2004) Figure 3.3. With thanks to Richard Breen for providing these figures.

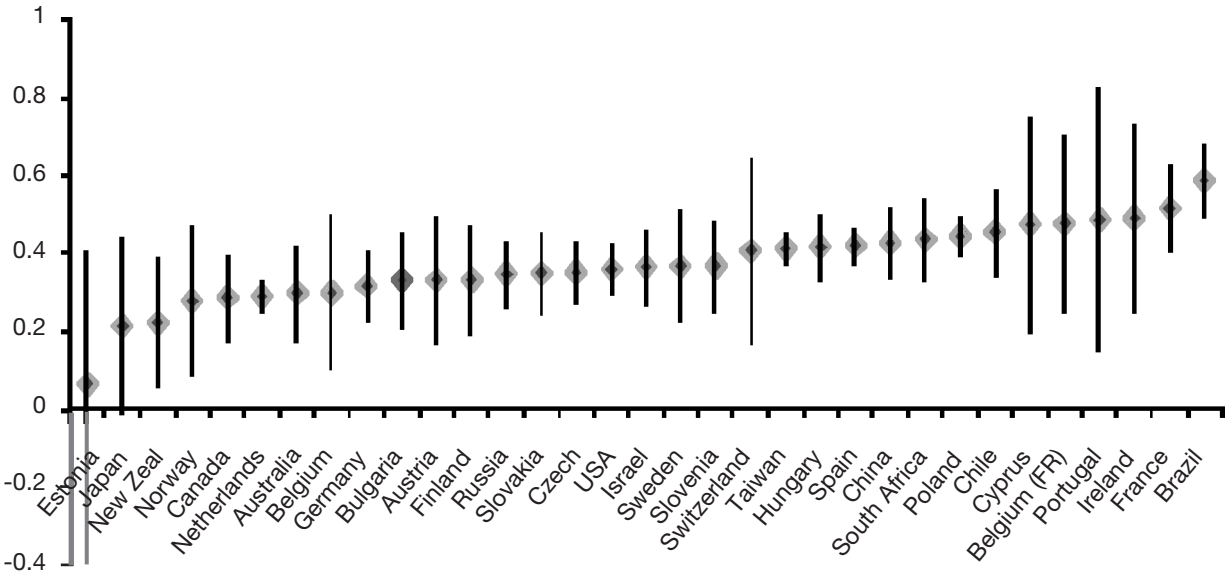
between the Nordic nations and the US. As discussed by Björklund and Jäntti (2000) and revealed clearly in Figure 3 Sweden and US both appear to be rather high mobility nations when measured by social class in the 1970s. Germany has the least mobility in Breen (2004) and is among the lower mobility nations in Erikson and Goldthorpe (the sample of comparator countries is rather different), this is in contrast to our earlier results for income mobility for which Germany looks rather mobile. It should be noted that Erikson and Goldthorpe consider mobility for all sons in the 1970s, they will be including those born several decades before the 1960s; the main cohort considered for our summary measure of income mobility.

Breen updates the UniDiff model up to the 1990s, again selecting all adult males rather than a particular cohort. His results for the most recent time period are given in the final bar for each country in Figure 4. Once again we see striking differences between these results and those for income mobility, the least mobile country is Germany, and Poland is found to be one of the most mobile countries (in contrast Andrews and Leigh found it to have high income persistence). There are clearly some striking differences between international rankings of mobility depending on whether they are measured by income or social class. Some of these differences might be explicable by dramatic changes in mobility across cohorts (this might be the case for Poland) but it seems unlikely that they are all explained by this. One plausible explanation is that within social class, differences in income mobility are sufficiently large such that the two measures do not correspond. We might anticipate such an effect with such large class groupings. An alternative is that the class groupings used are not equally good at representing the true occupational structure across nations. We next turn to results for status mobility to see if these results also differ to such an extent.

Ganzeboom and Treiman (2007a and 2007b) have been kind enough to supply some results from their latest international comparison of status mobility. Their results are based on pooling useable observations on fathers' and sons' occupations from a variety of data sources and then attempting to understand why correlations vary according by context, where a context is defined by the interaction of country, labour market entry cohort (5 year categories) and years of experience (10 year categories). As the authors have supplied the correlations by context we need to decide which is most comparable with the other results presented here. Our selected group are those entering the labour market in 1980-1985, whose occupations are observed with between 10 and 20 years of experience. Year of entry into the labour market is based on the year that education ended, so these cohorts were born between the mid-1950s and the late-1960s.

Figure 5 provides a graph of the correlations between fathers' International Socio-Economic Index (ISEI) and sons' ISEI across countries. This provides information on a larger number of countries than we have seen so far. As far as we can say, it seems that many of the patterns in the intergenerational income mobility literature are repeated: Norway and Canada are among the highest mobility countries while Brazil, France, Chile and Poland (along with other less developed nations and southern European countries) are at the other end of the scale. Once again the US and Sweden are close together in the centre of the graph. Germany's position is more similar to its ranking by income mobility than class fluidity. As with the income elasticities presented in Figure 1, it is noticeable that the standard errors are large, giving few clear differences between countries.

Figure 5: Ranking of Countries by Intergenerational Status Correlation



Source: Figures were kindly provided by Harry Ganzeboom, Ganzeboom and Treiman (2007b). They give the correlation in socio-economic status between sons and fathers for sons who joined the labour market between 1980 and 1990 and whose occupations were observed 10-20 years later. Lines show 95% confidence intervals.

There are caveats to be borne in mind when using these results. It seems natural to consider the extent to which estimates vary within nations; how would the picture in Figure 5 look if we had chosen a different cohort or experience level? Different measures for the same country are generally positively related but the correlation is not high (about .3 for the same cohort at different experience levels). It seems likely that this weak association is attributable to the mix of different data sources used to estimate the correlations, unfortunately the data provided does not allow us to assess the influence of the source dataset on the results. The dependence of the year at labour market entry on the education level means that the year of birth is negatively correlated with the time spent in education for our selected sample, a feature not present in the other estimating samples we use.

A limited review of the extensive social class and status mobility literature indicates that, despite the limitations of the estimates used here, measures of status appear to be capturing something similar to measures of income mobility while measures of class are more divergent. Notable exceptions to this statement are the US and Sweden which appear at opposite ends of the intergenerational income mobility ranking but are found rather more close together in the middle of the distribution when intergenerational associations are measured by status or class. Germany appears to be more immobile by class or status measures than it does by income. We will attempt an explanation of these findings at the end of this section after considering the findings from intergenerational correlations in education.

3.3 Educational Persistence across Generations

As mentioned in our discussion of measurement, intergenerational educational associations can be computed either for years of education or education categories. Hertz et al (2007) measure association using years of education for a large number of countries and results for both the regression coefficient and correlation are provided in Table 2. The first striking result is that Hertz et al (2007) find confirmation of two results found for a more limited range of countries elsewhere; that social mobility is low in South America and high in the Nordic nations. Of the western nations, Italy and the US are the least mobile as measured by the intergenerational correlation in years of education. Great Britain is immobile when measured by the intergenerational elasticity but mobile when measured by the correlation. This difference stems from the low variation in years of schooling for parents in the sample and indicates a limitation of measuring mobility in this way. For all countries in the sample the correlation between the coefficient and correlation is 0.40.

Results for the Bartholomew index and Eigen values from Chevalier et al (2007) are provided in Table 3, listed here from least to most mobile by the Eigen-value. The order of nations is becoming familiar, with Germany, Chile and Poland at the top and the Nordic countries at the bottom. In this ranking Great Britain appears to be rather immobile, less so than Italy. In contrast the US is in the lower-middle part of the Table in this case only a little less mobile than the Nordic nations. In the remainder of our analysis we take the eigen value as our preferred measure of categorical

Table 2: Measures of Association in Years of Schooling

	Elasticity	Rank	Correlation	Rank
Peru	0.88	6	0.66	1
Ecuador	0.72	12	0.61	2
Panama	0.73	11	0.61	3
Chile	0.64	18	0.60	4
Brazil	0.95	4	0.59	5
Colombia	0.80	8	0.59	6
Nicaragua	0.82	7	0.55	7
Indonesia	0.78	9	0.55	8
Italy	0.67	17	0.54	9
Slovenia	0.54	27	0.52	10
Egypt	1.03	2	0.50	11
Hungary	0.61	20	0.49	12
Sri Lanka	0.61	19	0.48	13
Pakistan	1.00	3	0.46	14
USA	0.46	33	0.46	15
Switzerland	0.49	30	0.46	16
Ireland	0.70	15	0.46	17
South Africa	0.69	16	0.44	18
Poland	0.48	31	0.43	19
Vietnam	0.58	23	0.40	20
Philippines	0.41	36	0.40	21
Belgium	0.41	35	0.40	22
Estonia	0.54	28	0.40	23
Sweden	0.58	26	0.40	24
Ghana	0.71	13	0.39	25
Ukraine	0.37	40	0.39	26
East Timor	1.27	1	0.39	27
Bangladesh	0.58	25	0.38	28
Slovakia	0.61	21	0.37	29
Czech Republic	0.44	34	0.37	30
Netherlands	0.58	24	0.36	31
Norway	0.40	38	0.35	32
Nepal	0.94	5	0.35	33
New Zealand	0.40	37	0.33	34
Finland	0.48	32	0.33	35
Northern Ireland	0.59	22	0.32	36
Great Britain	0.71	14	0.31	37
Malaysia	0.38	39	0.31	38
Denmark	0.49	29	0.30	39
Kyrgyztan	0.20	42	0.28	40
China (rural)	0.34	41	0.20	41
Ethiopia (rural)	0.75	10	0.10	42

Source: Table 2 of Hertz et al (2007)

Table 3: Intergenerational Mobility Parameters from Transition Matrices of Educational Level

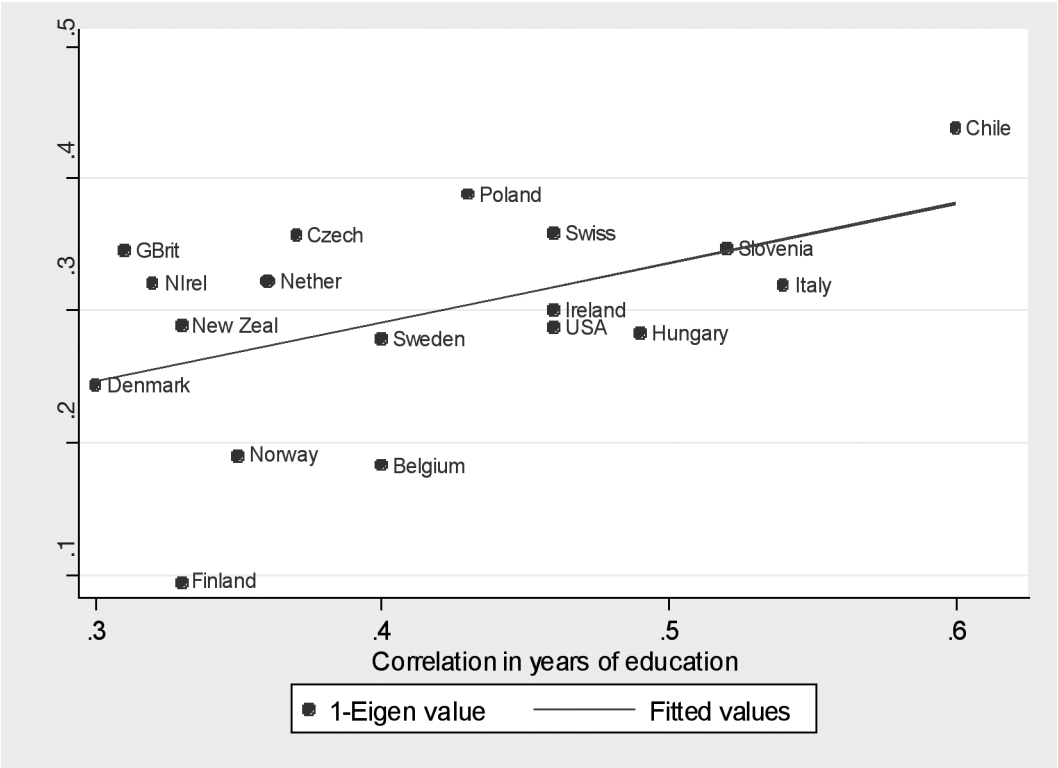
	Bartholomew index	Rank	Eigen-value	Rank
Germany	0.684	2	0.518	1
Chile	1.024	14	0.562	2
Poland	0.977	11	0.612	3
Switzerland	0.642	1	0.641	4
Czech Republic	1.010	13	0.643	5
Slovenia	0.709	3	0.653	6
Great Britain	1.059	17	0.655	7
Netherlands	0.725	4	0.677	8
Northern Ireland	1.067	18	0.679	9
Italy	0.878	6	0.681	10
Ireland	1.027	15	0.700	11
Canada	1.067	19	0.704	12
New Zealand	0.967	10	0.711	13
USA	1.049	16	0.713	14
Hungary	0.749	5	0.718	15
Sweden	0.927	7	0.722	16
Denmark	0.993	12	0.747	17
Norway	0.965	9	0.810	18
Belgium (Flanders)	1.102	20	0.817	19
Finland	0.937	8	0.905	20

Source: Figures are from Chevalier, Denny and McMahon (2007) and were kindly provided

education persistence, because the meaning of this measure in terms of the speed at which origins are forgotten seems to have more in common with the intergenerational income parameters than the Bartholomew index does. We use (1-eigen value) as this has the same implication – higher equals less mobility – as the other measures we have used so far.

To complete this section we consider the relationship between our two preferred measures of educational mobility, Hertz et al's correlation and 1-eigen value. A scatter plot of these two measures is found in Figure 6 and shows a fairly strong relationship between the two measures with a correlation of 0.5.

Figure 6: The relationship between our two measures of educational mobility



Source: Figures from Tables 2 and 3. Correlation between two measures is .49, regression line has slope 0.45. If Chile is excluded the correlation and coefficients reduce to around 0.33.

3.4 What are the similarities and differences? How can they be explained?

Throughout our selected summaries of the income, social class, status and education mobility literature, we have made comments on the ways in which the measures and rankings have pointed towards common patterns of mobility across nations and we have also drawn attention to stark differences in the implications of these literatures for particular countries.

In terms of similarities; South America, other developing nations, southern European nations and France tend to have rather limited mobility by all measures. The Nordic countries tend to have rather high mobility, although Sweden often appears to be less mobile than the other nations. There are also some notable differences between the measures. Generally speaking the US appears rather immobile by income and education measures while appearing much more mobile by measures of social class and status. Germany in contrast is rather mobile on income but immobile for social class and education. The UK tends to be towards the immobile end of the spectrum on all measures.

In Section 2.4 we considered the links between the different notions of social mobility. These suggest some ways in which differences in results can be reconciled. As discussed in Björklund and Jäntti (2000) the differing results for the US are explicable by the fact that it is a high inequality nation, with a large amount of income variation within the broad social class measures. An explanation of the differences for Germany might be lower inequalities within class and weaker income returns to class and education. An alternative explanation for the outlying results for social class may be that the ability of Erikson and Goldthorpe's measure to describing the class structure varies across countries. This might be because differences between the classes (in terms of some underlying latent variable) differs. Ganzeboom and Treiman's approach should mitigate this to some extent as their index is explicitly scaled by income and education, however, as we have seen, the ISEI correlations that are currently available have their own problems in terms of robustness and comparability with other measures.

Table 4 provides an overall picture of the similarities and differences in the different measures by listing the correlation coefficients between them. In many cases the sample of countries used do not overlap very much resulting in rather small sample sizes, we therefore would not want to over-emphasise these results. One thing that is very clear is that while the measures of income, education and status links across generations tend to be positively correlated this is not the case for the measures of social class fluidity. It appears that these constructs are tapping into rather different mechanisms; we therefore do not include them in the rest of our analysis. Note that the two measures of social class fluidity are closely linked for the eight countries that have both available; this is true even though they relate to different periods.

Table 4: Correlations between different intergenerational mobility measures

	Preferred Income β	Andrews and Leigh income β	Andrews and Leigh income correlation	E & G β	Breen β (1990s)	Status corr 1980 cohort exp=15	Years of ed corr
Andrews and Leigh income β	0.291 [6]						
Andrews and Leigh income correlation	0.352 [6]	0.973 [16]					
E & G β	0.035 [8]	-0.354 [7]	-0.281 [7]				
Breen β (1990s)	-0.315 [5]	-0.323 [4]	-0.351 [4]	0.687 [8]			
Status corr 1980 cohort exp=15	0.779 [9]	0.301 [15]	0.357 [15]	0.405 [11]	0.195 [7]		
Years of education correlation	0.732 [6]	0.695 [9]	0.644 [9]	-0.122 [10]	-0.526 [7]	0.454 [19]	
1-Eigen value	0.319 [10]	0.415 [10]	0.454 [10]	0.120 [11]	0.224 [8]	0.350[16]	0.488 [18]

Note: The number of countries used to calculate the correlation is given in square brackets.

3.5 Aside on Changes over Time

Our analysis so far has concentrated on comparing intergenerational mobility across countries for people currently in the labour market, born around 1960. While we can learn a lot from these measures they are obviously not a measure of mobility for those growing up in the policy environment of the 2000s. Before proceeding, it therefore seems worthwhile to make some comments about the changes in mobility over time as measured by the four different measures and to consider the picture for children growing up today.

The results for the UK included in this paper refer to the period before the fall in intergenerational mobility found in Blanden et al (2005). This picture of a relatively unfavourable trend in mobility for the UK is also confirmed by Hertz et al (2007) for educational correlations which show an increase over a fifty year period.The latest evidence for the UK indicates that this fall in mobility has not continued among cohorts born from the mid 1980s onwards (Blanden and Machin, 2008).

Changes in intergenerational income mobility in the US have been considered quite extensively in recent years. Corcoran (2001), Fertig (2003/4) and Mayer and Lopoo (2005) all find a fall in intergenerational persistence while studies by Levine and Mazumder (2002) and Lee and Solon (2006) have more ambiguous findings. Aaronson and Mazumder (2007) find a rise in the intergenerational elasticity from 1980 to 2000 but no change in the intergenerational income correlation. Results for the US on educational mobility in Hertz et al (2007) show a rise in the intergenerational correlation of education.

In the study we draw on for the French results in Table 1, Lefranc and Tannoy (2005) explore changes across cohorts considering cohorts born 1937–47, 1945–55 and 1963–73. The last two groups may be seen as broadly comparable with those considered for the UK but in contrast to the UK results, their estimates of β remain very steady across all three cohorts.

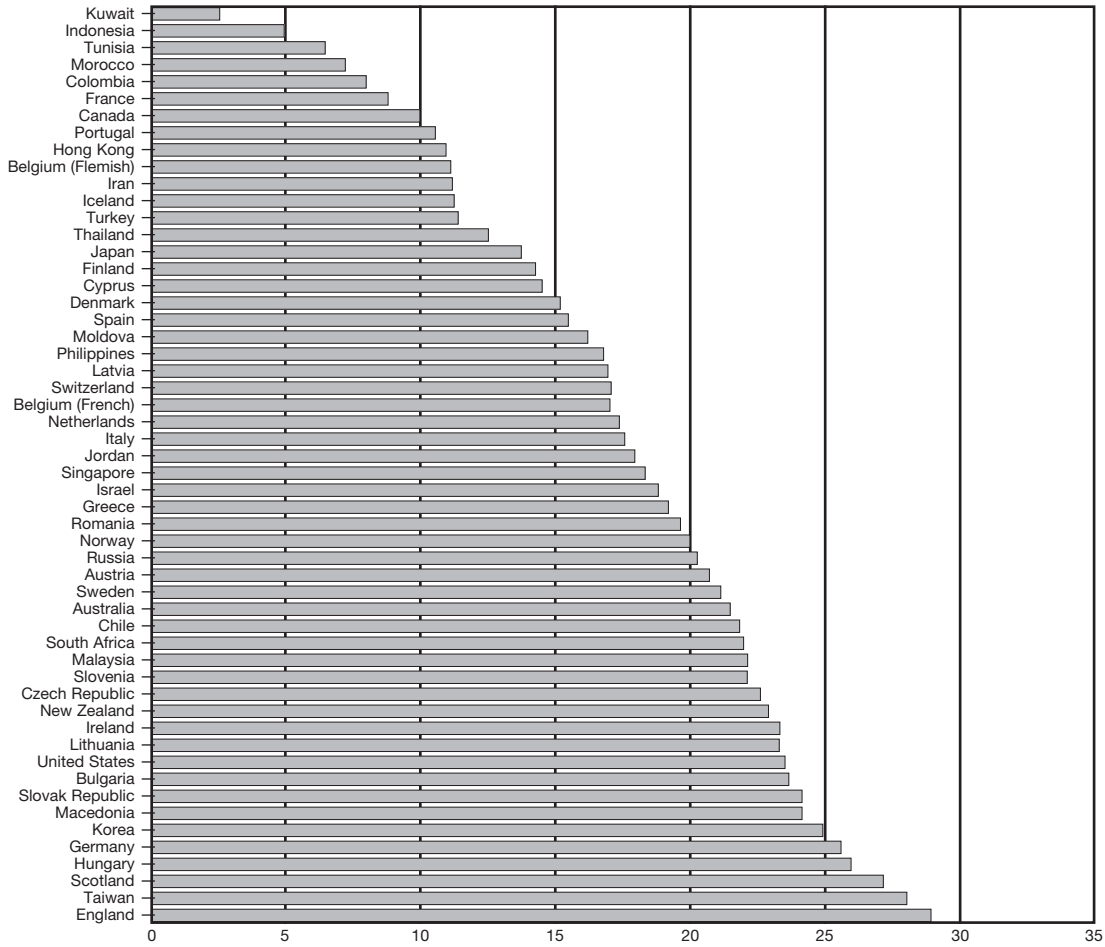
Two studies of changes over time have been carried out for Nordic countries. The analysis presented in Bratberg et al. (2005) for Norway compares intergenerational elasticities estimated for the 1950 and 1960 cohorts when they were in their early 30s, cohorts which slightly predate those used in Blanden et al.'s (2005) analysis. The authors find a slight decline in intergenerational associations for sons. Österbacka (2004) considers this question for Finland and finds no clear trend.

In light of the concern that changes in mobility over time might lead to differences in the international ranking of countries for children growing up today, Figure 7 taken from Scheutz, Ursprung and Woessman (2005) shows the relationship between family background and test scores in TIMSS which seeks to measure the achievement of children in a comparative way across nations. It is noticeable that the US and UK (alongside Germany) appear to have rather strong relationships between family background and test scores among children growing up today.[6]

[6] These rankings are also confirmed by figures from PISA in OECD (2001).

For cohorts not yet in the labour market, those in Germany, the UK and the US (alongside some developing and transition nations) appear to have the poorest prospects for mobility through education.

Figure 7: Estimated Effects of Family Background on Students' Test Scores Across Countries



Note. Family background effects are based on reported measures of the number of books at home; test scores are average maths and science scores from TIMSS. The family background effects are estimated from statistical regressions explaining standardised test scores based on the number of books at home. As standardised test scores have an international standard deviation of 100, these effects can be interpreted as percentages of an international standard deviation by which test achievement increases if the number of books is raised by one category. The authors validate these estimates by also looking at other measures of family background from the 2001 Progress in International Reading Literacy Survey (PIRLS).

Source: Scheutz, Ursprung and Woessman (2005).

4. Can we explain the patterns?

4.1 Theoretical Models

This paper has so far provided a (selective) review of the literature on international comparisons of intergenerational mobility and found some common themes in the story presented by the different approaches. The next step is to move beyond these regularities and begin to try to explain the differences across nations. We first consider the theoretical perspectives that have been taken on this question before considering the empirical evidence.

Solon (2004) provides an economic model which explains intergenerational mobility as a function of parental and state investments in children. He shows that intergenerational income persistence will be higher if heritability (the genetic transmission of endowments) is higher, if the productivity of investment in education is higher, if the returns to education are higher and if government investment in human capital is less progressive. Solon also shows that the same parameters are important for generating income inequality such that inequality and intergenerational persistence will tend to have a positive relationship.

We might also think of other more direct relationships between inequality and mobility. If the distribution of income is wider in country A than country B children at the bottom may be relatively more disadvantaged in country A and will face greater barriers to upward movement. The desire to improve social mobility in the UK is in part behind the policy aim to eradicate child poverty. While we know that those from poorer households do worse on numerous outcomes the evidence on the mechanisms behind the link between income inequality during childhood and adolescence and impacts on mobility is rather limited, this paper only begins to address this question.

4.2 Cross Sectional Income Inequality

The relationship between mobility and inequality is of considerable interest. The American Dream is based on the hypothesis that cross sectional income inequalities can be offset by equality of opportunities, and that inequality should be less of a concern if there is a high level of mobility. If greater inequalities go hand-in-hand with fewer opportunities it is much more alarming. Our basic picture of Nordic countries at the top of the mobility ranking and South America at the bottom certainly points towards a negative correlation between the two, and Andrews and Leigh (2008) confirm this statistically. We check this for the countries we have here and experiment with using different measures of inequality and child poverty.

Our inequality measures are predominantly taken from the Luxembourg Income Study (LIS) which provides cross-nationally comparable estimates for a variety of measures of income inequality and child poverty. Led by the theoretical discussion above we would like to consider inequality measured at two points, when the children were growing up and at the point when their adult outcomes are measured. As we have focused on children who were born around 1960 we

would ideally require income inequality measures for the 1970s. The number of nations for whom inequality data is available in the LIS increases as we consider more recent years. We start with 1982, but for those countries where this is not available we use later years. We supplement this information with income inequality taken from the World Bank dataset based on Deininger and Squire (1996), which is also used by Andrews and Leigh (2008). This provides inequality measures for the late 1970s/early 1980s. Information on inequality in the adult years is available for 1995 and 2000 from the LIS.[7]

Table 5 provides the correlations between income inequality and our measures of social immobility. In all cases these are positive. Nations with high inequality tend to have high persistence in social status for all of our measures. Although we would not want to make too much of it owing to the small sample sizes used there are some interesting variations in the strength of these correlations.

Table 5: Correlations between inequality and intergenerational mobility

	Preferred Income β	Andrews and Leigh income β	Andrews and Leigh income correlation	Status correlation	Years of education correlation	1-Eigen value
LIS measures early-mid 1980s						
Income gini	0.58 [11]	0.60 [9]	0.55 [9]	0.53 [18]	0.63 [13]	0.439 [15]
Atkinson coefficient ε=0.5	0.58 [11]	0.56 [9]	0.50 [9]	0.55 [18]	0.62 [13]	0.398 [15]
90/10	0.59 [11]	0.50 [9]	0.43 [9]	0.33 [18]	0.56 [13]	0.289 [15]
90/50	0.65 [11]	0.64 [9]	0.57 [9]	0.51 [18]	0.64 [13]	0.460 [15]
80/20	0.61 [11]	0.59 [9]	0.53 [9]	0.37 [18]	0.51 [13]	0.338 [15]
Child poverty	0.64 [11]	0.50 [9]	0.46 [9]	0.31 [18]	0.54 [13]	0.212 [15]
World Bank measure late 1970s – early 1980s						
Income gini	0.64 [12]	0.55 [13]	0.43 [13]	0.41 [22]	0.49 [22]	0.154 [16]
Later LIS inequality						
Gini 1995	0.87 [11]	-0.13 [9]	-0.07 [9]	0.27 [15]	0.49 [13]	0.428 [16]
Gini 2000	0.84 [11]	-0.10 [10]	-0.15 [10]	-0.11 [18]	0.33 [15]	0.282 [16]

Note: The number of countries used to calculate the correlation is given in square brackets.

[7] An alternative source of inequality information is the share of top incomes, as brought together by Leigh (2007b); unfortunately these are only available for seven of the countries for which we have information on intergenerational income mobility.

Taking the Table as a whole the majority of correlations are quite large, at over 0.5, indicating a strong positive relationship between inequality and intergenerational mobility. There are some interesting differences across the measures, with our preferred income beta tending to be most strongly correlated with income inequality in adulthood while the other measures show a larger association with inequality levels earlier in the relevant cohort's life. This is not surprising as the income beta is most likely to pick up the influence of labour market returns while the other measures are less influenced by this and dependent on the opportunities available to the cohort as young people.

It is also notable that we see the income elasticity from Andrews and Leigh is more closely related to inequality than is the case for their correlation measure. Aaronson and Mazumder (2007) find that as inequality increased for the US from 1980 onwards the income elasticity rose while the income correlation remained constant.

There is no consistent evidence that the child poverty measure is more strongly correlated with immobility than are the general measures of inequality. Indeed, rather counter-intuitively it appears that the measures related to income inequality at the top of the distribution (the 90-50 ratio) has a stronger association with immobility than the other measures of income inequality, although the size of these differences is too small for us to discriminate such patterns with any certainty.

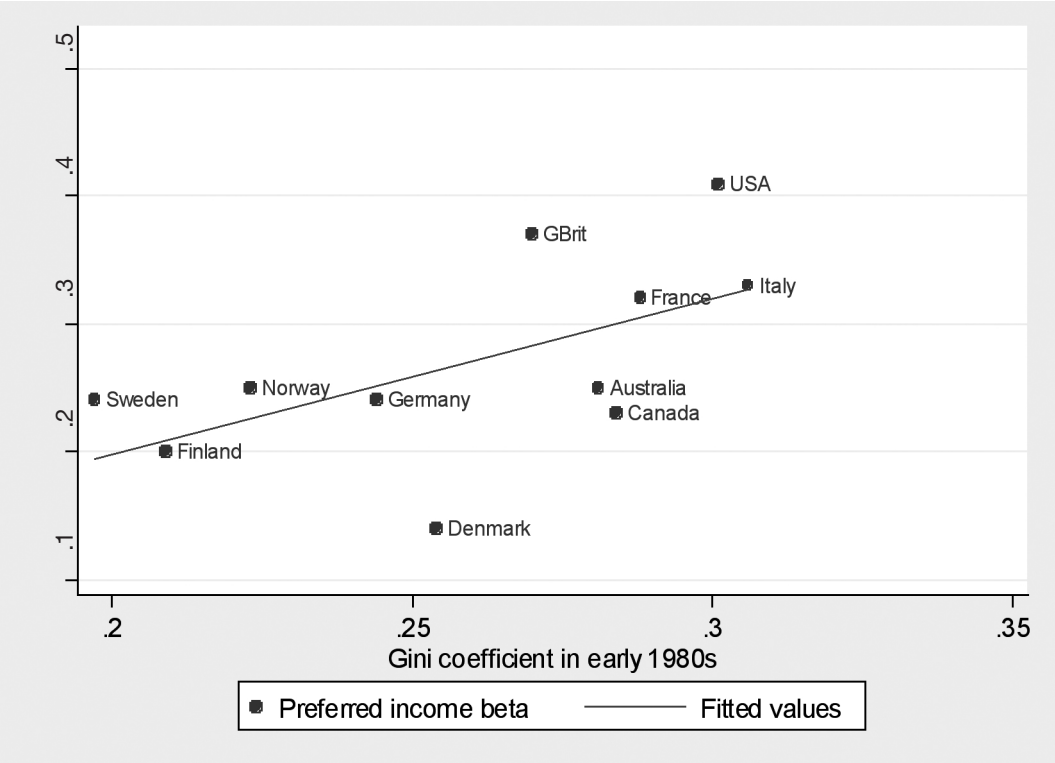
Our theoretical discussion of the relationship between inequality and mobility highlighted two possible mechanisms. One was that inequality and immobility tend to be generated by the same factors and that we would therefore expect the two to be correlated at the end of the process (when the second-generation are adults). The second is that inequality in childhood inhibits equality of opportunity. The limited evidence presented in Table 5 indicates that it is inequality in childhood that matters for the non-income measures while our preferred income mobility estimates are also very strongly correlated with inequality in adulthood. This is because intergenerational income mobility is influenced by the adult returns to characteristics such as education and occupation.

Figures 8a and 8b shows the relationship between the preferred beta and the gini-coefficient in the early 1980s and in 1995. This reveals why the correlation with income mobility is stronger for inequality measured in 1995 than in the early 1980s. The two key observations seem to be Denmark, for which inequality fell by about an eighth to match the low level of intergenerational persistence, and the UK where inequality rose by 25 percent over the period. One should be cautious in interpreting these results as a consequence, especially given the large standard error on the British estimate of beta.

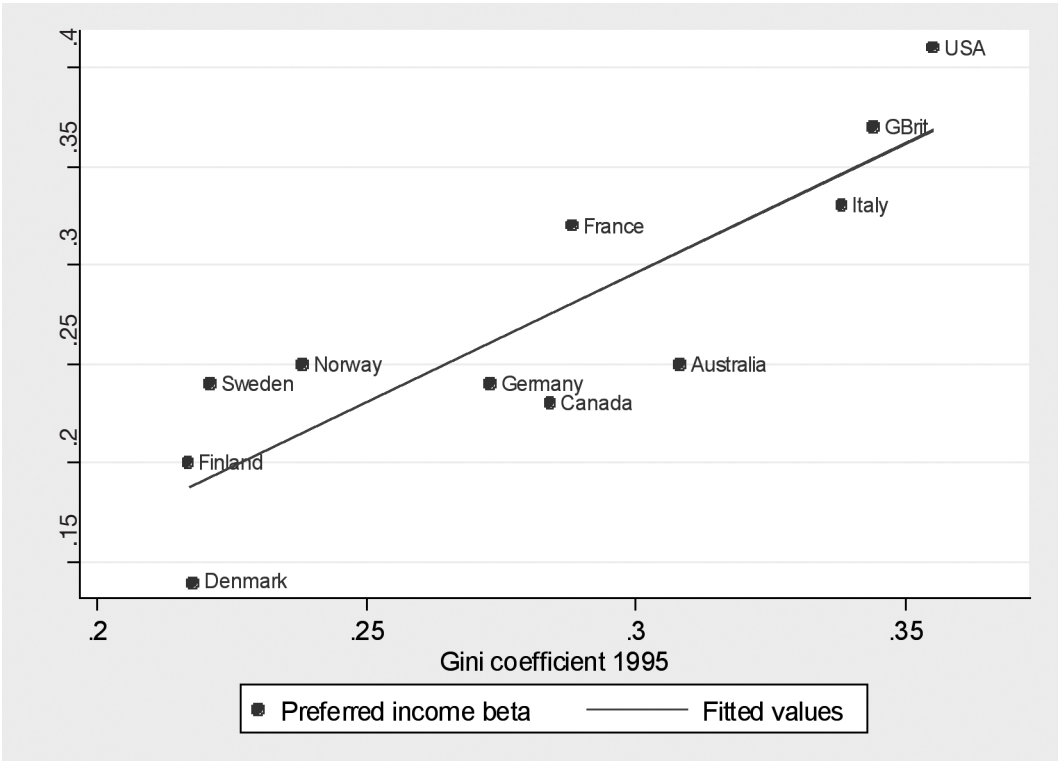
This preliminary analysis of the relationship between inequality and mobility has indicated several interesting pieces of evidence. 1) There is the expected relationship between inequality and mobility. 2) The relationship between mobility and poverty is not driving this, inequality at the top is important as well. 3) Inequality in childhood appears crucial for all measures, but inequality in adulthood also matters for our preferred measure of income persistence.

Figure 8: Associations between the Income Beta and Gini-coefficient

a) Early 1980s



b) 1995



4.3 Educational Investment

Solon (2004) highlights the importance of the progressivity of educational expenditure as a factor leading to greater mobility. We are rather limited in the way we can operationalise this concept, the OECD *Education at a Glance* provides a large amount of information on education spending such as the proportion of spending coming from private and public sources, however this information is difficult to obtain for the 1970s. Instead we use information from Barro and Lee's (1994) international panel dataset. This provides Government education spending as a proportion of GDP, for both total and recurring expenditures. This measure will certainly compound different aspects; the level of total spending relative to GDP, and the extent to which spending on the education is carried out by Government. We take average figures from 1965-1969 (the primary school years for the 1960 cohort) and 1970-1974 (the early secondary school years) and once again correlate these with our measures of mobility.

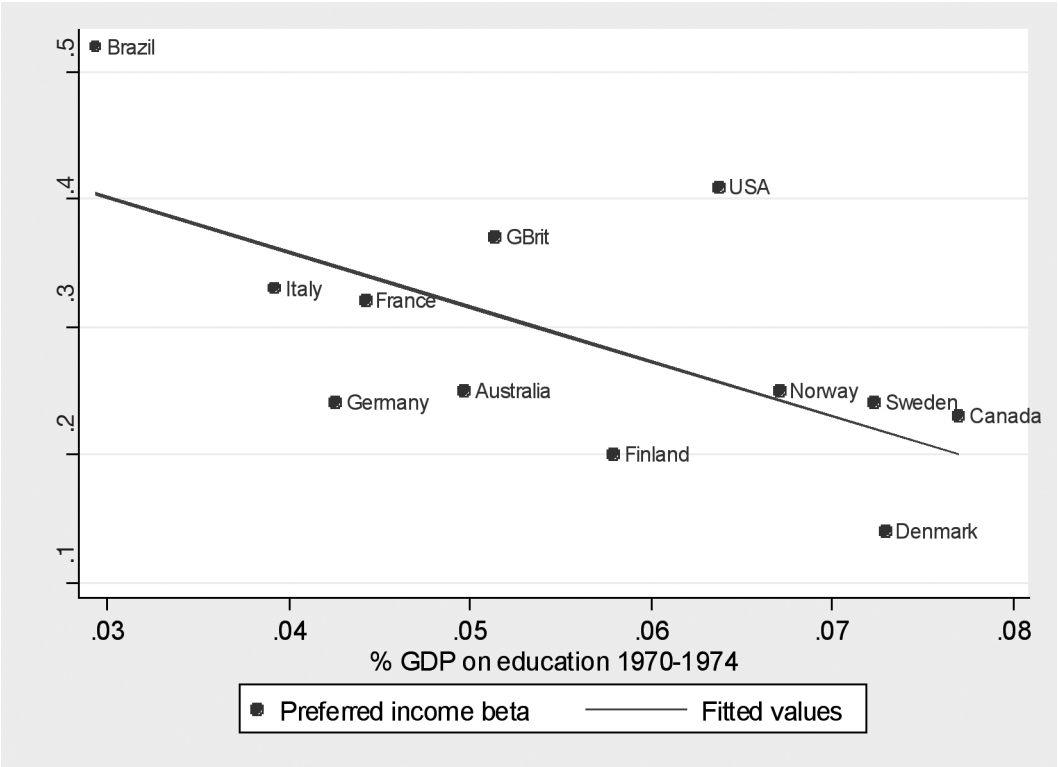
As we would expect, there is a negative relationship between education spending and intergenerational persistence. Those countries which devote more of their income to public spending on human capital investment tend to be more mobile. This correlation is slightly stronger with the income beta than with other measures, and these two variables are graphed in Figure 9. Interestingly Andrews and Leigh's correlation measure is more closely related to education spending than their elasticity is, so it is not the case that the previous result that elasticities correlate more strongly with inequality is replicated for all the explanators. Total education spending tends to be more closely related to mobility than recurring spending and there is no consistent pattern on the most important period of schooling, primary or secondary.

Table 6: Correlations between education spending and intergenerational mobility

	Education spend % GDP 1965-1969	Education spend % GDP 1970-1974	Recurring education spend % GDP 1965-1969	Recurring education spend % GDP 1970-1974
Preferred Income β	-0.566 [12]	-0.627 [12]	-0.594 [12]	-0.573 [12]
Andrews and Leigh income β	-0.365 [10]	-0.461 [10]	-0.350 [10]	-0.448 [10]
Andrews and Leigh income correlation	-0.405 [10]	-0.529 [10]	-0.392 [10]	-0.503 [10]
Status correlation	-0.539 [20]	-0.588 [20]	-0.538 [21]	-0.543 [20]
Years of education correlation	-0.462 [21]	-0.498 [22]	-0.434 [23]	-0.487 [22]
1-Eigen value	-0.547 [15]	-0.393[15]	-0.617 [15]	-0.438 [15]

Note: The number of countries used to calculate the correlation is given in square brackets.

Figure 9: Association between Income Beta and Education Expenditure



A possible explanation for the results is that education spending and inequality are picking up the same characteristics of nations. The correlation between the gini coefficient and education spending is in the region of -0.3 to -0.5. However some positive evidence comes from the status correlation measure; a regression of this on both the World Bank gini and educational expenditure in the 1970s gives a significant coefficient of the expected direction on both (although the coefficient on inequality is very small in magnitude). However, while this is indicative we do not really have enough data to robustly compare the influence of individual variables.

4.4 Returns to Education

A further prediction from Solon is that income mobility will be weaker when the returns to education are larger. Recall the relationship between intergenerational income mobility in country k (β_k) and the correlation in education across generations (γ_k). Clearly the return to education for the child has a positive relationship with the income β_k. We might also suspect that γ_k will have a positive link to the return to education as better educated parents will have a greater incentive to invest their extra resources in their children's education if the return to this is higher.

$$\beta_k = \frac{\phi_k^{child}}{\phi_k^{parents}}\gamma_k + \frac{\phi_k^{child} Cov(Ed_{ik}^{child}, v_{ik})}{Var(v_{ik})} + \frac{1}{\phi_k^{parents}} \cdot \frac{Cov(u_{ik}, Ed_{ik}^{parents})}{Var(Ed_{ik}^{parents})} + \frac{Cov(u_{ik}, v_{ik})}{Var(v_{ik})} \quad (14)$$

Table 7 gives correlations between our mobility measures and the returns to education as listed in Psacharopoulos and Patrinos (2004). Once again the correlation is as expected. Two measures are used, the average return to a year of education and the return to higher education. The higher education measure is more strongly related to mobility than the average measure. This could be interpreted as being because higher education is the most important route for intergenerational persistence/mobility, but it may also be the case that the higher education return is subject to less measurement error across countries. Our predictions concerning the relative strength of correlations with different measures of mobility are also found to be accurate. Both measures of returns are found to be correlated more strongly with income mobility (all three measures of this) than with status or educational mobility. This is because income mobility is influenced by income returns through the final outcome (earnings) while educational mobility will only be influenced by returns because of the incentives to invest.

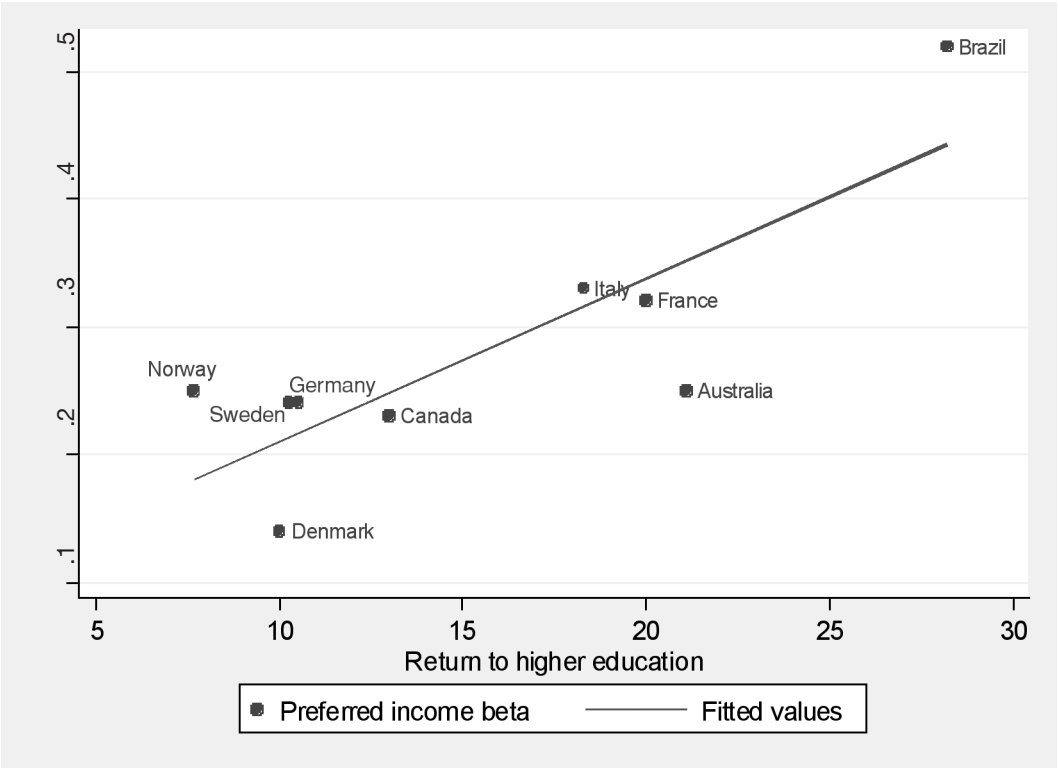
Table 7: Correlations between education returns and intergenerational mobility

	Returns to each year of education	Returns to higher education
Preferred Income β	0.625 [13]	0.826 [9]
Andrews and Leigh income β	0.559 [12]	0.797 [9]
Andrews and Leigh income correlation	0.498 [12]	0.798 [9]
Status correlation	0.250 [25]	0.502 [18]
Years of education correlation	0.278 [32]	0.318 [22]
1-Eigen value	0.275 [15]	0.549 [11]

Note: The number of countries used to calculate the correlation is given in square brackets.

Figure 10 shows a scatter-plot of the relationship between higher education returns and the income beta. This graph gives further evidence as to why the income and education rankings differ for Germany; Germany has a low return to education compared with Italy and France.

Figure 10: Relationship between the Income Beta and the Return to Higher Education



5. Conclusions

While this paper has not provided an exhaustive review of the cross-country literature on income, social status and educational mobility across generations it does suggest that these literatures all point towards a similar international ranking. Notable exceptions are the US and Germany. The US is immobile by our income measure but rather more mobile in terms of social status and education whereas for Germany the reverse is true.

Our examination of the factors generating differences in mobility gives a clue to the reason for these findings. Lower mobility tends to be correlated with greater inequality, lower educational spending and higher returns to education. Of all our measures intergenerational income mobility is most strongly influenced by inequality and the payoff to education. This provides a hint as to the reasons for the difference in rankings for the US and Germany by different measures as there is substantially greater inequality within education and social class groupings and higher returns in the US compared to Germany.

Our results on the relationship between inequality and mobility also point towards some other conclusions. The first is that inequality in childhood/youth is strongly related to all our measures

of intergenerational persistence, with measures of inequality in adulthood most strongly related to income mobility. These findings work against the hypothesis that inequality and mobility only vary together because they are driven by the same processes. A second finding is that inequality at the top end of the distribution is more strongly linked to mobility than inequality at the bottom; it is not simply differences in child poverty that drives the inequality-mobility relationship.

In order to derive really solid policy recommendations we would need evidence that as education spending, inequality and education returns change so does the rate of mobility, with sufficient observations to allow us to unpick the influence of different variables. Some evidence on this comes from Blanden et al (2005) who find a fall in mobility at the same time as inequality widened in the UK. A really persuasive assessment of these questions would use a large panel dataset to link changes in mobility across countries to changes in our other variables of interest.

Nonetheless: inequality seems to matter for mobility and it appears that this relationship is not simply mechanistic. If it were a natural consequence of the way mobility is measured it would be found only in measures of income mobility and not for measures of mobility by social status and education. This is not the case; while inequality appears to be most strongly associated with income mobility the relationship is clear for all our measures of intergenerational persistence. As emphasised above, it is not just the extent of poverty at the bottom end which matters; inequality at the top end has an impact too. This is worth bearing in the mind in the UK where most measures of mobility have levelled off since 1997 but top incomes have continued to move away (Brewer et al 2008).

The finding that countries with higher education spending have more mobility also has obvious policy implications. However one should be cautious about assuming that any rise in spending relative to GDP will have a positive effect on mobility; we do not know enough at this stage about how the money must be spent to be effective. That said, the UK has had a strong recent positive trend in education spending, it has increased from 4.5% in 1997/98 to 5.7% in 2006/07 (HM Treasury).

Coming to our third explanatory variable, the returns to education, it is not obvious that Governments should seek to reduce this as an end in itself. However it is the case that as more young people become highly qualified and educational opportunities are expanded the returns are likely to fall due to a rise in supply. An even expansion in educational qualifications across all family backgrounds will therefore have a 'double whammy' effect on mobility, reducing the heritability of education and the reward to education in terms of income.

This survey paper cannot hope to build a comprehensive picture of the drivers of mobility across different countries without more data on changes across countries and over time. The findings presented are instead suggestive, with inequality, education spending and educational returns all found to have the expected relationship with mobility. With a few notable exceptions the literature on income, status and educational mobility seems to point to a similar ranking of countries. This indicates that important lessons can be learned from all of these literatures.

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Table A1: Summary of international literature on intergenerational persistence for sons

Study	Country	Data source	Son's outcome variable	Parental income variable	Approach to measurement error	$\hat{\beta}$	$\hat{\rho}$
Solon (1992)	USA	Panel Survey of Income Dynamics	Log annual earnings in 1984, ages 25–33	Log annual earnings, 1967–72	Five-year average of father's earnings	0.41 (0.09)	
			Log annual earnings in 1984, ages 25–33.	Log annual earnings in 1967	Father's education used as an instrumental variable	0.53 (0.014)	
Zimmerman (1992)	USA	National Longitudinal Survey	Log annual earnings in 1981, ages 29–39	Log annual earnings over 1966–71	Four-year average of father's earnings	0.54 (0.08)	
			Log annual earnings in 1981, ages 29–39.	Log annual earnings in 1971	Duncan Index used as instrumental variable.	0.67 (0.15)	
Mazumder (2002)	USA	Survey of Income and Program Participation matched to Social Security Record	Log of average earnings over 1995–98; sons born 1963–68	Log annual earnings over 1970–85	16-year average of father's earnings	0.58 (0.11)	
Couch and Dunn (1997)	Germany and the USA	German Socio-Economic Panel and PSID	Log annual earnings averaged over 1984–89, sons on average aged 23 in Germany, 25 in the USA	Log annual earnings averaged over 1984–89	Five-year averages	Germany: 0.11 (0.06) USA: 0.13 (0.06)	
Wiegand (1997)	Germany	German Socio-Economic Panel	Log monthly earnings in 1994; sons aged 27–33	Log monthly earnings averaged over 1984–89	Five-year average	0.32 (0.07)	
Vogel (2008)	Germany	German Socio-Economic Panel	Sons observed in 2003 at ages 25-50 with average 34.4. Thus they were born: 1953-78	Fathers observed at ages 27-56 with average 43.4	Five-year average	0.246 (.084)	
Björklund and Jäntti (1997)	Sweden and the USA	Swedish Level of Living Survey and PSID	Log annual earnings in 1990, sons born 1952–61	Father's earnings predicted from observables in a separate dataset.	Two-sample instrumental variables (TSIV)	Sweden: 0.36 (0.11) USA: 0.52 (0.14)	Sweden: 0.29 (0.09) USA: 0.41 (0.11)
Gustafsson (1994)	Sweden	Matched register and tax data, for fathers in Stockholm 1955	Four-year average of log individual income; sons born 1939–45	Father's individual income in 1955	Four-year average	0.14 (0.07)	

Table A1 (continued): Summary of international literature on intergenerational persistence for sons

Study	Country	Data source	Son's outcome variable	Parental income variable	Approach to measurement error	$\hat{\beta}$	$\hat{\rho}$
Österberg (2000)	Sweden	Matched register data	Sons aged 25 and over in 1990, earnings averaged 1990-1992	Fathers' average earnings in 1978-1980	Three-year average	.129 (.011)	
Björklund and Chadwick (2003)	Sweden	Matched register data	Sons born 1962-1965, earnings observed in 1999	Father's income averaged from 1970-1975	Five-year average	0.24 (0.01)	
Hirvonen (2007)	Sweden	Matched register data	Sons born 1960-1966 earnings averaged over 1997-2000	Parental income averaged 1970-1975	Five-year average	0.275 (0.004)	
Österbacka (2001)	Finland	Finnish quinquenniel population census	Log average annual earnings in 1985, 1995, 2000; sons born 1950–60	Log average annual earnings in 1970 and 1975	Two-year average but five years apart	0.13 (0.005)	0.156 (.006)
Pekkarinen et al. (2006)	Finland	Finnish quinquenniel population census	Son's earnings in 2000 at ages 34-40, born 1960-66	Father's earnings averaged over 1970,1975, 1980, 1985, 1990 at an unknown age	Average over 5 periods, in total 20 years apart	0.25-0.30 (around 0.020)	
Nilsen et al (2008)	Norway	Matched register data	Sons earnings averaged over ages 36-40; born 1959-1962	Father's earnings averaged over different periods. Fathers born 1927-1942	Time averaging, as reported in next column	67-71: .338 72-76: .282 77-81: .253 82-86: .163 67-86: .320	
Hussein, Munk and Bonke (2008)	Denmark	Matched register data	Son's annual earnings in 2000 at ages 30-40, born 1960-1970	Father's annual earnings averaged over 1984-1988 when aged 30-66	Average over 5 years	0.136 (0.004)	Not reported
Corak and Heisz (1999)	Canada	Matched income tax data	Log annual earnings in 1995; sons born 1963–66	Father's log annual earnings averaged over 1978-82	Five-year average of father's earnings	0.23 (0.01)	
Atkinson (1981)	UK	Follow-up of Rowntree York Sample	Log weekly earnings at survey date (1975–78)	Log weekly earnings in 1950.	None	0.36 (0.03)	

Study	Country	Data source	Son's outcome variable	Parental income variable	Approach to measurement error	$\hat{\beta}$	$\hat{\rho}$
Dearden et al. (1997)	UK	National Child Development Survey	Log weekly earnings at age 33 for a cohort born in 1958	Father's log weekly earnings when son aged 16	Instrumental variables using father's education and social class	0.58 (0.06) OLS results are 0.24 (.027)	
Nicoletti and Ermisch (2007)	UK	British Household Panel Survey	Average log earnings over 1991-2003 for sons born 1952-1970	Information on occupation education and age of fathers used to predict their earnings. Prediction is from older men in 1991 or as close to as possible	Two-sample instrumental variables (TSIV)	0.29 (0.06)	
LeFranc and Tannoy (2005)	France	French Education–Training–Employment surveys 1964–93 (FQP)	Log annual earnings for sons aged 30–40, 1993 FQP	Information on father's education and social class used to predict earnings from similar-aged men in FQP.	Two-sample instrumental variables (TSIV)	Approx. 0.4	
Piraino (2007)	Italy	Bank of Italy Survey on Household Income and Wealth (SHIW)	Log annual earnings in 2000, 2002, 2004 for 30–45 year-olds whose fathers were born between 1927 and 1949	Information on father's education, employment status occupation and region used to predict income from men in 1977–79 SHIW aged 30–50	Two-sample instrumental variables (TSIV)	0.435 (0.035)	
Mocetti (2007)	Italy	SHIW as above	Log annual earnings in 2000, 2002, 2004 for 30–50 year-olds	Information on education, sector, region and occupational qualification used to predict income from men in 1977–80 aged 30–50	Two-sample instrumental variables (TSIV)	0.499 (0.051)	

Table A1 (continued): Summary of international literature on intergenerational persistence for sons

Study	Country	Data source	Son's outcome variable	Parental income variable	Approach to measurement error	$\hat{\beta}$	$\hat{\rho}$
Leigh (2007)	Australia	Household Income and Labour Dynamics in Australia Panel Study of Income Dynamics	Log annual earnings in 2004 for sons aged 25-54	Average earnings in 2004 for men in father's occupation where father's occupation is recalled by adult son	Two-sample instrumental variables (TSIV)	Australia: 0.2-0.3 US: 0.4-0.6	Correlation likely smaller than elasticity
Dunn (2007)	Brazil	PNAD cross-sectional data	Log annual earnings in 1996 for sons aged 25-34	Earnings are predicted from father's education, education and earnings relationship is obtained from males aged 30-50 in the 1976 survey.	Two-sample instrumental variables (TSIV)	0.688 (0.014)	

Early Years Policy

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One of the key challenges for schools in addressing inequality of educational attainment, and promoting social mobility, is that substantial gaps in school readiness are already present at school entry. In the US, studies have found that roughly half the gap in school achievement between less advantaged and more advantaged children is already present when children start school (see e.g. Phillips, Crouse, and Ralph, 1998). Sizable gaps in school readiness among young children have been documented in the UK as well (see e.g. Feinstein, 2003). The presence of such large gaps even before children start school has prompted a great deal of interest in the role that early years policy might play in narrowing these gaps. If schools are to promote equality of educational achievement, surely it would help if children were able to start school on a more equal footing.

The interest in the early years has also been spurred by new research and scholarship in fields such as neuroscience, developmental psychology, and economics. The release of the National Academy of Sciences report *From Neurons to Neighborhoods* (Shonkoff and Phillips, 2000) brought new attention to research on early brain development and the importance of experiences in the early years for child health and developmental outcomes. At the same time, economist James Heckman was emphasizing the importance of the early years for human capital formation, arguing that investments made in the early years would lay the foundation for learning in those years and in the future (Heckman and Lochner, 2000). Heckman has also joined with developmental psychologists in emphasizing that both cognitive and non-cognitive aspects of development are consequential for later life chances (see e.g. Carneiro and Heckman, 2003).

A further impetus for the growing interest in early years policy is the availability of rigorous evidence that high-quality interventions can improve child development in the early years. Random assignment studies (the "gold standard" of empirical research) of programs such as Perry Preschool, Abecedarian, Infant Health and Development, and Nurse-Family Partnerships have found that high-quality early years programs can improve child health and development for disadvantaged children, in both cognitive and non-cognitive domains (see reviews in Karoly et al., 1998; Karoly, Kilburn, and Cannon, 2005). These results provide grounds for optimism that well-crafted policies could play a role in narrowing gaps in school readiness.

At the same time, however, there are clearly some limits to what early years programs can accomplish. Some portion of the differences that emerge in the early years will be due to factors that are not readily altered by policy. A further challenge is that not all early years programs are equally effective, high-quality programs are not inexpensive, and even the most promising model programs may not work as well when delivered on a large-scale. There are also thorny issues to be grappled with regarding the extent to which such programs are best delivered universally or targeted to disadvantaged groups.

In this paper, we use three types of evidence to analyze the role that early years policy might play in narrowing educational attainment gaps. We begin by documenting how large the gaps in school readiness are between low-, middle-, and high-income children in the US and the UK, drawing on data from new large and nationally representative birth cohort studies. To briefly preview those results, we find that sizable income-related gaps in school readiness are already present in both countries before children enter school.

We then go on to decompose the gaps in school readiness (drawing on the very detailed data from the US cohort) to identify the factors that account for the poorer scores of low-income children, as well as those that account for the better scores of high-income children. No one factor drives these results. Rather, a host of differences – in factors such as parenting style and the home environment, maternal and child health, early childhood care and education, and maternal education and other demographic factors – together help explain why low-income children come to school less ready to learn, and why high-income children come to school with an advantage.

What role could early years policy play in tackling these types of differences? We consider this question in the final section of the paper. Drawing on the best available evidence – emphasizing results from random assignment studies where available – we discuss what policy reforms would be most effective in helping to close early gaps. To play a role in closing early gaps, policies must 1) effectively address a factor that is consequential for early gaps and 2) do more to improve the school readiness of disadvantaged children than more advantaged children (because they are targeted to disadvantaged children, or, if programs are universally available, because they address gaps in access to beneficial services or have a greater impact on outcomes for disadvantaged children). We identify a number of promising programs that have the potential to meet these criteria.

1. How large are the gaps in early childhood?

We use data from two nationally representative birth cohort studies to document the magnitude of the gaps in school readiness in the US and the UK. For the US, we use data from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), which gathered data on over 10,000 children born in 2001, with interviews at roughly 9 months, 2 years, and 4 years post-birth. For the UK, we use data from the Millennium Cohort Study (MCS), which collected data on over 19,000 children born in 2000 and 2001, with interviews at 9 months, 3 years, and 5 years post-birth. Both surveys over-sampled some populations of interest, but when properly weighted, the data are nationally representative of all families with newborns.[1] Not all children remain in the sample for all waves, and in addition, some children have missing data on cognitive or behavior outcomes.[2] For the US, we are able to use a total of 8,903 children in constructing our income groups and a slightly smaller sample of 7,960 in analyzing cognitive and behavior outcomes. For the UK, we use a total of 13,423 children in constructing our income groups and a sample of 10,476 in our analysis of cognitive and behavior outcomes.

[1] The survey weights, which we use in all our analyses, also correct for attrition (i.e. the loss of some families to follow-up).

[2] Cases that are missing cognitive or behavior outcome data differ somewhat from the cases that remain in the sample and have complete outcome data; in particular, they are disproportionately likely to be from racial/ethnic minority groups or immigrant groups.

Income-related gaps

Because our main focus is on income-related gaps in school readiness, we begin by dividing our samples into groups defined by family income over the course of early childhood (i.e. averaged over the three survey waves). Specifically, we divide families into income quintiles, with the first quintile defined as the families with incomes in the bottom fifth of the income distribution for all families with newborns, the second quintile defined as families with incomes in the second to bottom fifth, and so on.[3]

Table 1 shows the income/needs ratios and illustrative family income data for the quintile groups in the US. The bottom quintile has gross family incomes (i.e. incomes before taxes) that place them below the official US poverty line,[4] and the income for an illustrative family – with two parents and two children – is less than $16,500 (in 2001 dollars).[5] The middle-quintile families have incomes ranging from 1.5 to 2.5 times the poverty line, with our illustrative family having an income of between $27,800 and $45,600. In contrast, families in the top quintile have incomes more than 4 times the poverty line, and the illustrative family has an income in excess of $76,500.[6] Table 2 provides comparable data for the UK. We have used an absolute poverty line and expressed income in gross terms for the UK to make the analysis as comparable as possible to the US. It is important to note that this absolute poverty line is set at a higher level in the UK than it is in the US.[7] It is apparent from this table that the income distribution is less skewed in the UK than it is in the US. Particularly notable is the lower median income of the top quintile group in the UK (and their lower median income/needs ratio) as compared to the income of the top group in the US.

[3] Our income measures are standardized for family size and composition. For the US, we use the income-to-needs ratio, which standardizes the family's income relative to the official US poverty threshold for a family of a given size and composition. For the UK, we follow the convention for that country which is to standardize family incomes by family size and composition using the OECD equivalence scale. Then, to facilitate comparison with the US, we relate the family's equivalized income to an absolute poverty line (defined as 60% of median equivalized income before housing costs in 1996/97, uprated only for inflation). There are some missing data on income in the surveys. The US survey imputes missing values for income and we use those in our analysis. The UK survey does not impute missing values for income so we carry out our own imputation so that we can include the full income distribution in defining our quintiles. It should also be noted that the income measures are not completely comparable across the two datasets; in the US data, families report their gross annual income, whereas in the UK survey, families report their net annual income. In Table 3, for illustrative purposes only, we convert net income summary statistics for the UK to gross income using the formula Net=Gross-0.3(Gross-5000).

[4] As detailed in the prior note, this is defined using an absolute poverty threshold that varies by family size and composition.

[5] As shown in Table 1, this translates to an income of less than £10,300 (in 2001 pounds) when adjusted for purchasing power parity (PPP); see notes to Table 1 for details.

[6] These income figures may seem low, but it is important to keep in mind that they refer not to all families but rather to families with newborns, who tend to be younger and to have lower incomes than other families.

[7] The UK mainly uses a relative poverty line. When it does use an absolute line, it defines absolute poverty as income below 60% of what median income was in 1996/1997 (uprated for inflation). The US poverty line is lower as a percent of median income. For this reason, poor and near-poor families have higher gross incomes in the UK than they do in the US (see Tables 1 and 2). Differences in disposable income, however, will be much less marked because of the higher average tax rate in the UK. The OECD tax database gives an average tax rate for a married one-earner couple with two children of 23.2% in the UK in 2001, compared with only 8.5% in the US.

Table 1: Family income distribution of the US cohort

Income/needs ratio		Example: 2-parent, 2-child family, 2001 US dollars (Gross income)			Example: 2-parent, 2-child family, 2001 GB pounds (Gross income)	
Boundaries	Median	Boundaries		Median	Boundaries	Median
Q1	< 0.92	0.64	< 16 500	11 500	< 10 300	7200
Q2	0.92 - 1.55	1.23	16 500 - 27 800	22 000	10 300 – 17 400	13 800
Q3	1.55 - 2.54	1.99	27 800 - 45 600	35 800	17 400 – 28 500	22 400
Q4	2.54 - 4.26	3.29	45 600 - 76 500	59 100	28 500 – 47 900	37 000
Q5	> 4.26	6.35	> 76 500	114 100	> 47 900	71 400

Table 2: Family income distribution of the UK cohort

Income/needs ratio		Example: 2-parent, 2-child family, 2001 US dollars (Gross income)			Example: 2-parent, 2-child family, 2001 GB pounds (Gross income)	
Boundaries	Median	Boundaries		Median	Boundaries	Median
Q1	< 0.89	0.63	< 22 600	15 100	< 14 100	9400
Q2	0.89 - 1.44	1.17	22 600 - 38 800	30 600	14 100 – 24 300	19 100
Q3	1.44 - 2.01	1.71	38 800 - 55 500	46 600	24 300 – 34 700	29 100
Q4	2.01 - 2.88	2.38	55 500 - 81 000	66 200	34 700 – 50 700	41 400
Q5	> 2.88	3.87	> 81 000	108 200	> 50 700	67 700

US poverty line for 2-adult, 2-child family in 2001 = 17 960 USD or 11 200 GBP (Gross income).
UK poverty line = 60% median equivalized disposable household income BHC in 1996/7. Amount for 2-adult, 2-child family is a net income of 20 500 USD or 12 850 GBP, approximately equivalent to a gross income of 25 900 USD or 16 200 GBP.
Currency conversion uses OECD PPP from 2001, 1 USD = 0.626 GBP.
UK gross income figures approximated using the formula: Net = Gross – 0.3(Gross – 5000)
All figures rounded to the nearest 100.

Table 3: Demographic characteristics of the US cohort, by income quintile (weighted proportions, N = 8903)

Proportion with characteristic	Income/needs quintile					
All	Lowest	Second		Middle	Fourth	Highest
White	0.54	0.25	0.41	0.52	0.71	0.79
Black	0.14	0.31	0.14	0.12	0.07	0.04
Hispanic	0.25	0.38	0.37	0.28	0.14	0.09
Asian	0.03	0.01	0.02	0.02	0.03	0.04
Mixed race	0.04	0.04	0.04	0.04	0.04	0.03
Other	0.01	0.02	0.01	0.01	0.01	0.00
Mother foreign born	0.21	0.30	0.30	0.18	0.13	0.12
Stable married	0.62	0.26	0.47	0.62	0.82	0.91
Stable cohabiting	0.06	0.10	0.11	0.06	0.03	0.01
Some single mother	0.18	0.29	0.25	0.20	0.10	0.06
Stable single mother	0.12	0.32	0.14	0.08	0.03	0.02
Other	0.03	0.03	0.03	0.04	0.02	0.01
Family member has disability	0.11	0.18	0.12	0.11	0.08	0.08
Maternal education (9 months)						
Less than high school	0.27	0.62	0.42	0.22	0.08	0.03
High school	0.22	0.24	0.30	0.29	0.17	0.08
Some college	0.27	0.13	0.24	0.37	0.37	0.23
Degree or more	0.24	0.01	0.04	0.12	0.38	0.67
Maternal age (at birth)						
Less than 20	0.11	0.23	0.17	0.12	0.03	0.01
20 to 24	0.25	0.34	0.38	0.31	0.18	0.06
25 to 29	0.26	0.22	0.23	0.30	0.32	0.26
30 to 34	0.24	0.14	0.14	0.18	0.31	0.41
35 or more	0.14	0.07	0.08	0.10	0.17	0.27
Under 18s in household (at 4 yrs)						
1	0.18	0.14	0.19	0.20	0.19	0.20
2	0.42	0.29	0.38	0.41	0.51	0.53
3	0.25	0.29	0.27	0.24	0.23	0.20
4	0.10	0.16	0.11	0.11	0.06	0.05
5 or more	0.05	0.13	0.05	0.04	0.02	0.01

Descriptive statistics (in Table 3 for the US and Table 4 for the UK) provide an indication of how much the income groups vary in terms of some basic demographic characteristics that might matter for school readiness. It is clear that the bottom income quintile is disadvantaged along a number of dimensions, while the families in the top income quintile benefit from many advantages. How much does school readiness vary across these income groups? Figure 1 shows the income-related gaps for 4 year old children in the US in five measures of school readiness – literacy, mathematics, language, conduct problems, and attention/hyperactivity – all scored in terms of percentile scores that range from 1 to 100.[8] As is evident from the figure, there are sizable income-related gaps in all three cognitive measures. Children in the lowest-income families (quintile 1) score on average at the 34th percentile in literacy and the 35th percentile in language,

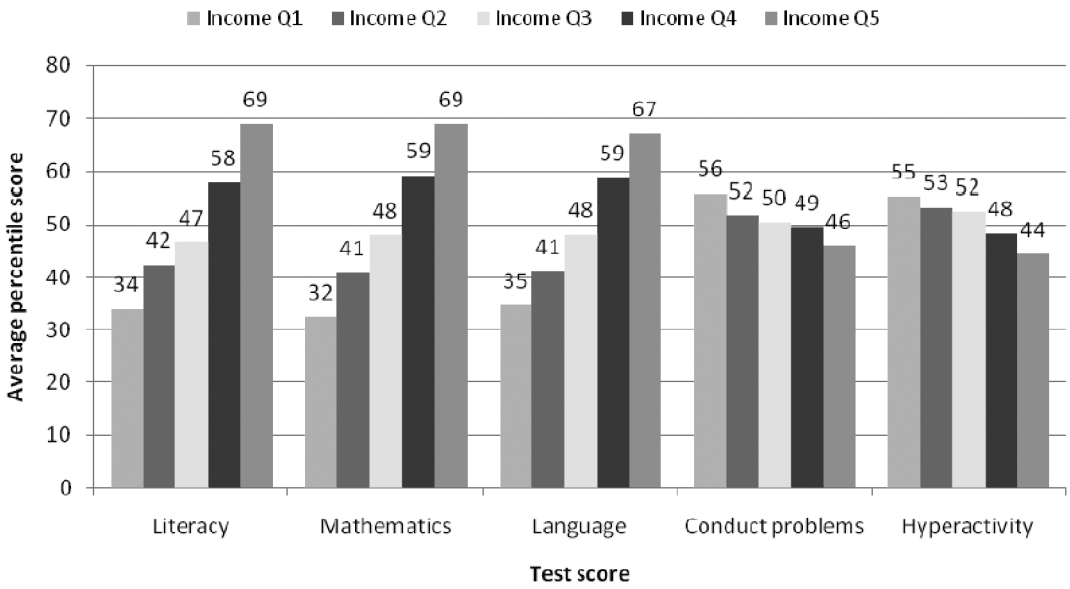
Table 4: Demographic characteristics of the UK cohort, by income quintile (weighted proportions, N = 13,423)

Proportion with characteristic	Income/needs quintile					
All	Lowest	Second		Middle	Fourth	Highest
White	0.90	0.77	0.89	0.94	0.96	0.93
Indian	0.02	0.03	0.02	0.01	0.01	0.02
Pakistani/Bangladeshi	0.03	0.11	0.03	0.01	0.00	0.00
Black	0.02	0.04	0.02	0.02	0.01	0.01
Mixed	0.03	0.05	0.03	0.02	0.02	0.03
Other	0.01	0.01	0.01	0.01	0.00	0.01
Mother foreign born	0.09	0.16	0.09	0.06	0.06	0.10
Stable married	0.65	0.29	0.57	0.73	0.81	0.88
Stable cohabiting	0.11	0.08	0.13	0.13	0.11	0.08
Some single mother	0.14	0.34	0.20	0.10	0.06	0.03
Stable single mother	0.06	0.24	0.05	0.01	0.01	0.00
Other	0.03	0.05	0.05	0.03	0.02	0.01
Maternal education (9 months)						
Below GCSE A-C	0.21	0.53	0.29	0.14	0.08	0.03
GCSE A-C	0.27	0.27	0.35	0.33	0.26	0.14
A-level	0.25	0.15	0.25	0.33	0.31	0.22
Degree or more	0.26	0.05	0.11	0.21	0.35	0.61
Maternal age (at birth)						
Less than 20	0.06	0.19	0.07	0.02	0.01	0.00
20 to 24	0.14	0.28	0.21	0.12	0.06	0.02
25 to 29	0.27	0.23	0.30	0.34	0.29	0.20
30 to 34	0.34	0.18	0.27	0.35	0.43	0.46
35 or more	0.19	0.11	0.14	0.17	0.21	0.32
Under 18s in household (at 5 yrs)						
1	0.15	0.18	0.12	0.13	0.16	0.16
2	0.50	0.33	0.45	0.53	0.59	0.60
3	0.24	0.25	0.28	0.26	0.20	0.20
4	0.08	0.14	0.12	0.06	0.05	0.03
5 or more	0.03	0.09	0.04	0.01	0.01	0.01

13 points lower than their middle-income peers (quintile 3), and at the 32nd percentile in math, 16 points lower than the middle-income group. In contrast, children in the highest-income families (quintile 5) have average cognitive scores at the 67th to 69th percentile, 19 to 22 points higher than the middle-income group and 32 to 37 points above the lowest-income group.

[8] The language, literacy and math scores are all derived using IRT methods from items selected specifically for the ECLS-B. The language assessment includes measures of receptive and expressive vocabulary; the literacy assessment includes measures of letter recognition, early reading skills, and phonological awareness (among other items); and the math assessment tests skills such as counting, number sense, geometry, and patterns. The conduct problems score comes from the mother's report of aggressive or acting-out behavior problems. The attention/hyperactivity score also comes from mother's report and measures problems with paying attention, sitting still, or concentrating on tasks. Children ranged in age from 3 to 5 at the time of assessment, although 80% were age 4; scores on all measures are standardized for the child's age before conversion to percentiles. All outcomes have a (population) standard deviation of 28.9.

Figure 1: Mean child outcome scores in the US cohort at age 4, by income quintile (N=7960)

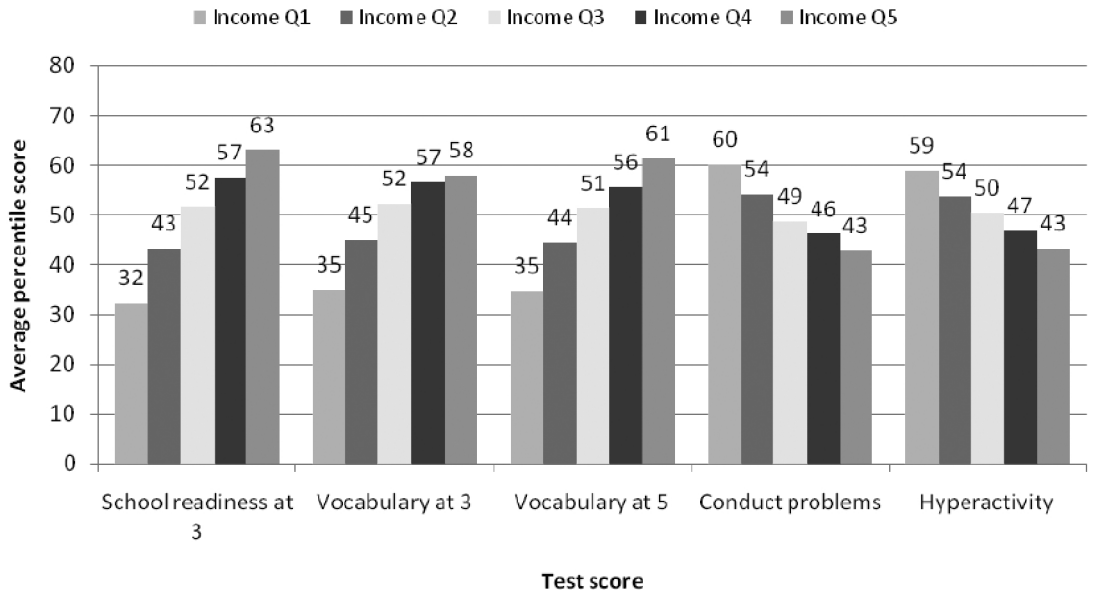


Gaps in behavioral dimensions of school readiness exist but are much less pronounced. The lowest-income children score 6 points higher on conduct problems and 3 points higher on attention/hyperactivity than the middle-income children, while the highest-income group scores 4 to 8 points lower (keeping in mind that on these behavior problem measures, lower scores are better as they indicate fewer problems).

Figure 2 provides information on income-related gaps in child outcomes for the UK. The measures for the UK sample differ somewhat from those available for the US sample. The measures of vocabulary, available at both ages 3 and 5, are highly comparable with the language test administered to the US cohort. The only available UK measure that is comparable with literacy and mathematics, however, is the school readiness composite administered at age 3.[9] Although the overall income gradients in the three cognitive measures are similar to those seen in the US, three differences are worth noting. The first is that the gaps in scores between the bottom income quintile and the middle income quintile are slightly larger in the UK than in the US, in large part because the scores of the middle quintile are slightly higher. The second is that the gaps between the top quintile and the middle quintile are smaller, in large part because the scores of the top

[9] Vocabulary is measured using the British Ability Scales Naming Vocabulary sub-scale at both 3 and 5. Six sub-scales from the Bracken School Readiness Assessment were used in the derivation of a school readiness composite score. These included knowledge of letters and numbers, and counting (similar to the ECLS-B assessments), and also knowledge of shapes, sizes, colors, and comparisons. Scores were age standardized and converted to percentiles in the same way used for the US data. Population standard deviations are 28.9 for school readiness and hyperactivity/attention, 28.8 for the two vocabulary measures, and 29.1 for conduct problems.

Figure 2: Mean child outcome scores in the UK cohort at ages 3 and 5, by income quintile (N = 10,476)



quintile are not as high as they are in the US. Third, comparing the top quintile to the bottom quintile, the gaps in scores are lower than they are in the US, ranging from 23 to 31 points. These differences make sense given that, as discussed earlier, the income distribution in the UK is less skewed and in particular has lower median incomes in the top quintile. However, income-related differences in behavior problems are more pronounced in the UK than in the US. This finding seems to be mainly driven by the higher behavior problem scores of the bottom income quintile in the UK. We can only speculate as to the reasons for this. Given that our UK measure of behavior problems comes from age 5 when many of the children have already started school (as compared to the US measure which comes from age 4), the higher levels in the UK may reflect the emergence of larger gradients with age or may reflect adjustment difficulties low-income children have on starting school.[10]

Gaps associated with race/ethnicity and nativity

Although our focus is on income-related gaps in school readiness, other types of gaps in school readiness are of interest to policymakers and researchers. In particular, a good deal of attention in the US has been focused on black-white test score gaps and, more recently, immigrant-native gaps (see e.g. Jencks and Phillips, 1998; Rouse, Brooks-Gunn, and McLanahan, 2005; Magnuson, Lahaie, and Waldfogel, 2006; Magnuson and Waldfogel, in press).

[10] The UK measure (the Strengths and Difficulties Questionnaire) like the US one is mother-reported, and the content of the two scales is highly similar.

Figure 3: Mean child outcome scores in the US cohort at age 4, by race/ethnicity (N = 7960)

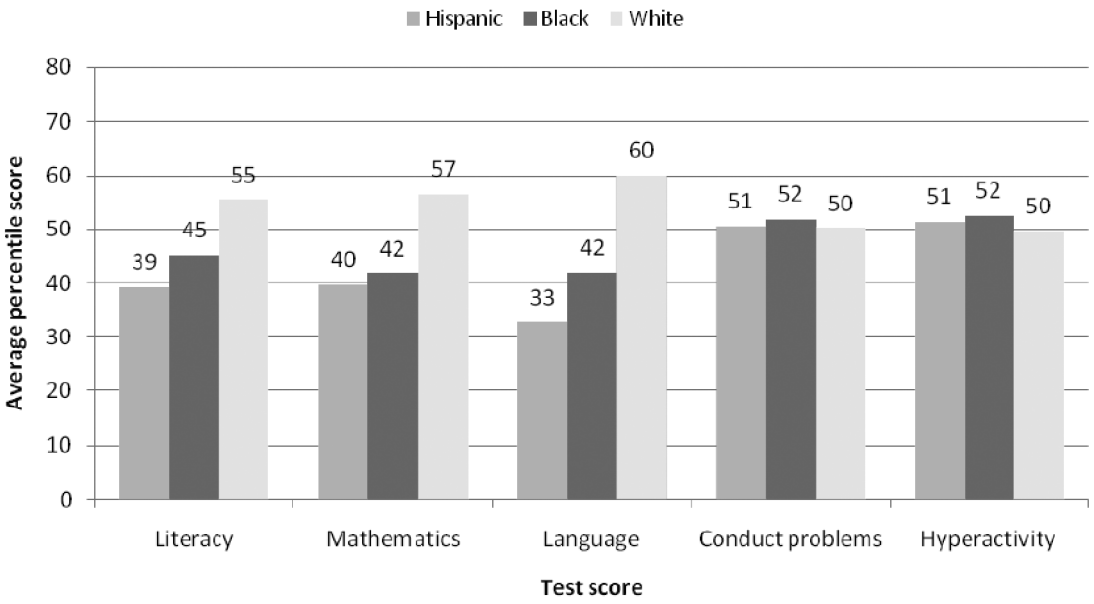
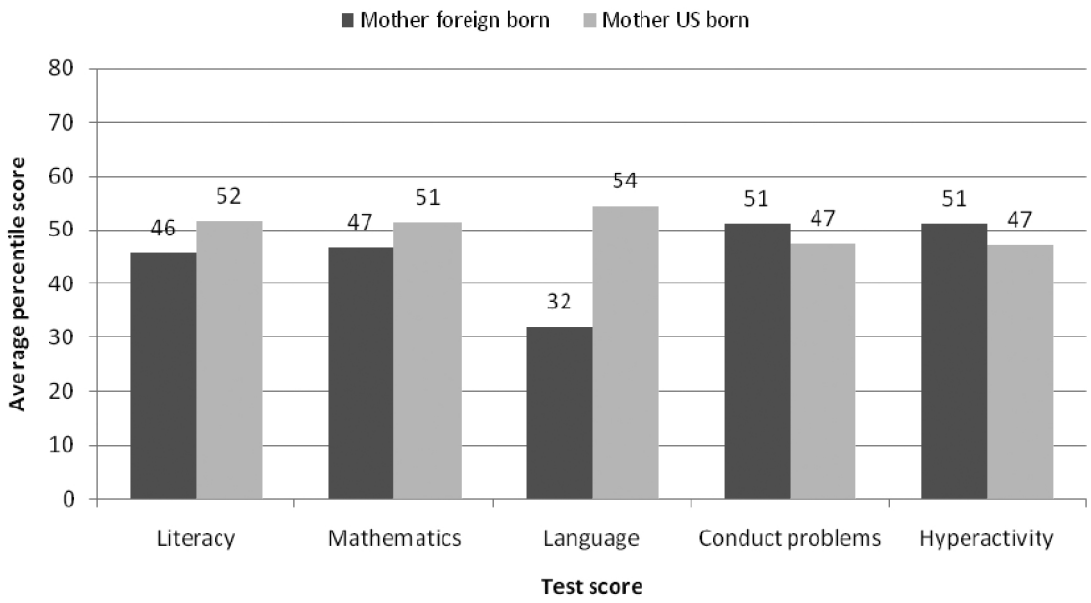


Figure 4: Mean child outcome scores in the US cohort at age 4, by mother's nativity (N = 7960)



In Figure 3, we show gaps in school readiness among US 4 year olds by race/ethnicity. The racial/ethnic gaps on the cognitive measures are sizable. Hispanic children score on average at the 33rd percentile in language and at the 39th and 40th percentile in literacy and math (respectively). Black children score better, averaging at the 42nd to 45th percentile across the three cognitive outcomes, but still lag behind non- Hispanic white children whose average scores range from the 55th to the 60th percentile. However, levels of behavior problems are nearly identical across the three groups.

Turning to immigrant-native comparisons, shown in Figure 4, the gaps in cognitive outcomes are small, except for language where as might be expected children of immigrants are 22 percentile points behind native children. Immigrant children also have slightly more behavior problems but the differences are small.

Comparable figures for the UK show Pakistani and Bangladeshi children lagging far behind white children in school readiness and vocabulary (Figure 5). Black children (a category that combines Black British children, children from the Caribbean, and children from Africa) also score lower than white children, particularly in vocabulary where they score at the 32nd and 33rd percentile at age 3 and age 5 respectively. In contrast, Indian children, while lagging in vocabulary at age 3, demonstrate a good deal of catch-up by age 5 and also score comparably to white children on school readiness at age 3. Behavior problem differences are less pronounced than the cognitive ones, but with some evidence of higher levels of behavior problems for Pakistani/Bangladeshi children than for children from the other groups.

Figure 5: Mean child outcome scores in the UK cohort at ages 3 and 5, by race/ethnicity (N = 10, 476)

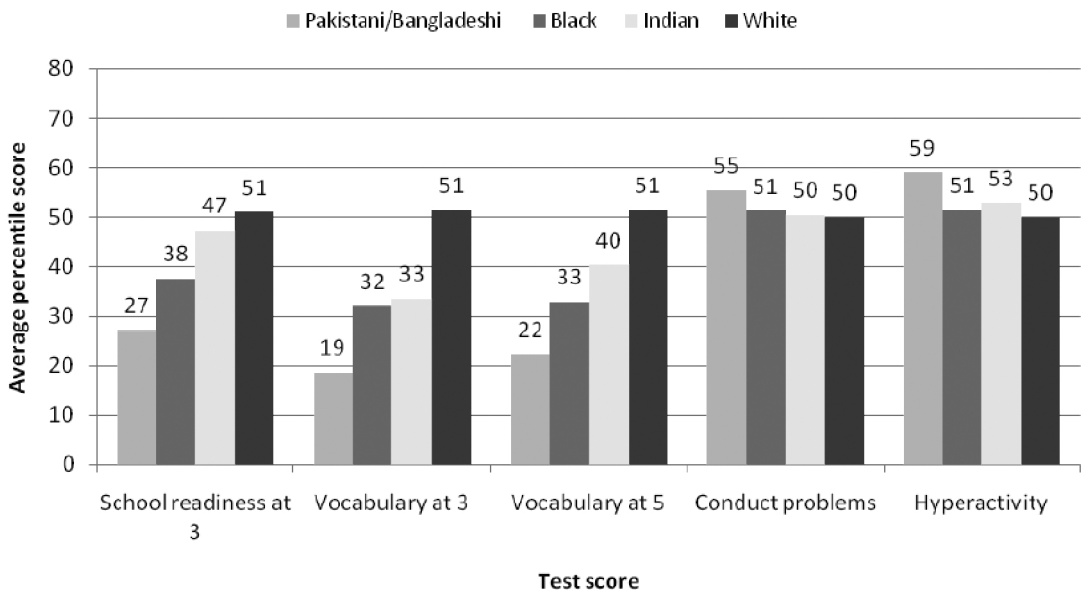


Figure 6: Mean child outcome scores in the UK cohort at ages 3 and 5, by mother's nativity (N = 10,476)

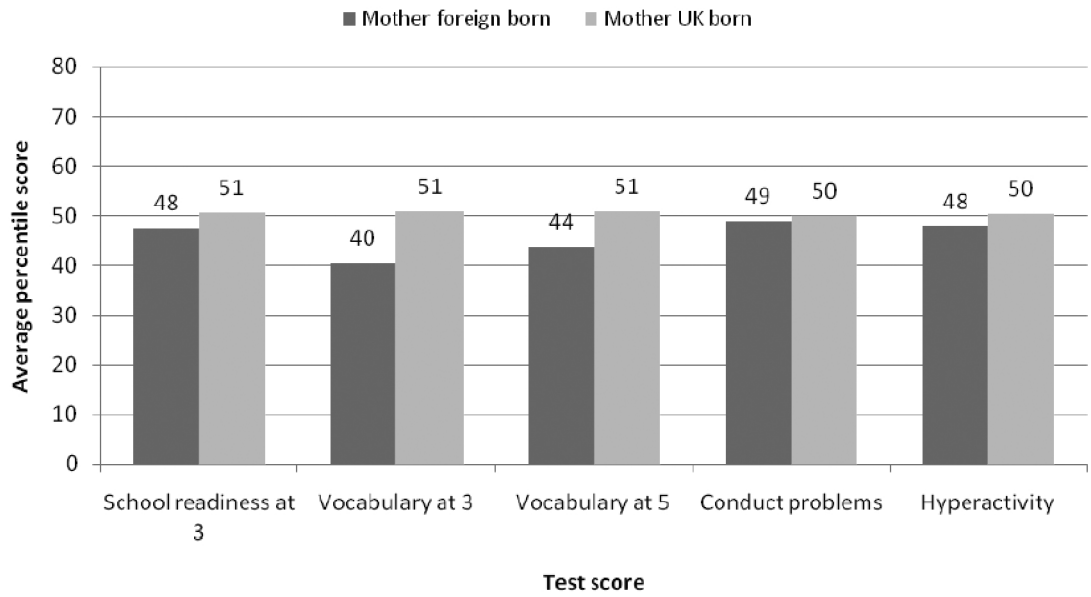


Figure 6 shows immigrant-native gaps for the UK. Although immigrant children lag in vocabulary at age 3 and, to a lesser extent, at age 5, their school readiness at age 3 is comparable to that of native-born children. Immigrant children have if anything fewer behavior problems than native-born children although the differences are very slight.

These comparisons suggest that income-related gaps are not the same as racial/ethnic or immigrant-native gaps. In general, racial/ethnic minority or immigrant groups do not lag as far behind in cognitive measures of school readiness as the bottom income quintile does.[11] This pattern of results reinforces the importance of looking at income-related gaps, as we do here.

[11] An exception here is the Pakistani/Bangladeshi group in the UK, which has lower average cognitive scores than the bottom income quintile.

2. What factors contribute to these gaps?

Having established that large income-related gaps exist in school readiness does not tell us what policies might be effective at reducing those gaps. The gaps shown in Figures 1 and 2 are raw gaps and are not adjusted for other factors that surely play a role in producing such gaps. Low-income families differ from middle- or high-income families along a number of dimensions. As discussed earlier, these families differ on a host of demographic characteristics (see Tables 3 and 4). And possibly even more consequential than these differences in demographic characteristics – who parents are – are differences in parents' behaviors and the resources they bring to parenting – what parents do. So we can not assume that increases in income by themselves would close all or even most of the income-related gaps that we find in the raw data.

To identify the factors that account for the income-related gaps in school readiness, we take advantage of the very detailed data in the US study, including direct observations of parenting style as well as measures of the home environment, maternal health and health behaviors, child health, and early childhood care and education, as well as family income and demographics. Focusing on the three cognitive outcomes (since the income-related gaps in the behavioral outcomes tended to be small), we use a two-step method to decompose the income-related gaps into the share accounted for by each of these major domains. In the first step, we use a simple regression model to estimate how much each of the contributing factors varies by income quintile; then, in the second step, we estimate cognitive outcome regression models including controls for all the contributing factors as well as controls for demographic variables and income quintile.[12] Combining information from the two steps allows us to calculate how much each factor contributes to the overall income-related gap in a given outcome (as shown in Table 5 and Appendix Table 1; see also Figures 7, 8, and 9).

A few caveats are in order. First, as with all non-experimental data, we can not be certain that our estimates reveal causal effects, and our estimates may be biased if key explanatory factors are omitted. Second, as discussed earlier, we are able to include in these analyses only those cases for which child outcome data are available. Third, as we discuss further below, because our models are estimated over the full sample, they assume that factors have the same effect on outcomes for low-, middle-, and high-income children; if a given factor has a stronger effect on low-income children, our estimates will not identify that. Fourth, at present we have carried out these estimates only for the US data; thus, results for the UK could differ.

In spite of these limitations, these estimates provide an indication of the relative importance of various factors – information that is useful for identifying policies that could play a role in closing gaps. And we would emphasize that these estimates are taken from models in which a very rich set of potential influences are included simultaneously, and hence allowed to "compete" with one

[12] Results of the two steps of the analysis are not shown here but are included in a more detailed companion paper (Waldfogel and Washbrook, 2008).

another for explanatory power. In the sections that follow, we briefly report on the major domains that we find to be consequential in explaining the income-related gaps in the three cognitive outcomes. We focus in our discussion on the gaps in school readiness between low-income children (quintile 1) and middle-income children (quintile 3), because these are the gaps that policies would be aimed at addressing, but we also show in Table 5 (and Appendix Table 1) information about the gaps between high-income children (quintile 5) and middle-income children (quintile 3), because these gaps also contribute to inequality of educational outcomes.

Table 5: Decomposition of the US income gradients in early childhood outcomes

Language		Literacy		Mathematics	
Q1	Q5	Q1	Q5	Q1	Q5
Total parenting style	-4.38	4.15	-2.67	2.87	-2.98	2.96
[32.9]	[21.8]	[21.0]	[12.9]	[19.2]		[14.1]
Total home learning environment	-2.24	3.10	-2.62	3.05	-2.52	2.78
[16.8]	[16.3]	[20.7]	[13.7]	[16.2]		[13.3]
Total maternal health & health behaviors behaviors	-0.47	0.52	-0.65	0.99	-1.00	1.28
	[3.5]	[2.7]	[5.1]	[4.5]	[6.5]	[6.1]
Total child health	-0.53	0.54	-0.48	0.48	-0.59	0.42
[4.0]	[2.9]	[3.8]	[2.1]	[3.8]		[2.0]
Total child care (excluding HS)	-0.60	0.94	-0.72	1.16	-0.64	1.44
[4.5]	[4.9]	[5.7]	[5.2]	[4.1]		[6.9]
Ever in Head Start	0.97	-0.51	1.17	-0.62	0.85	-0.45
[-7.3]	[-2.7]	[-9.2]	[-2.8]	[-5.5]		[-2.1]
Mother's education	-0.29	1.41	-1.85	4.00	-1.62	3.34
[2.2]	[7.4]	[14.6]	[18.0]	[10.4]		[15.9]
Total demographics	-2.48	3.43	-2.36	2.22	-2.47	2.71
[18.6]	[18.0]	[18.6]	[10.0]	[15.9]		[13.0]
All missing dummies	-0.26	0.03	-0.07	-0.03	-0.24	0.01
[1.9]	[0.1]	[0.5]	[-0.1]	[1.5]		[0.0]
Residual unexplained component	-3.04	5.45	-2.45	8.15	-4.36	6.44
[22.8]	[28.6]	[19.3]	[36.6]	[28.0]		[30.8]
Total gap	-13.31	19.06	-12.68	22.27	-15.56	20.93
[100]	[100]	[100]	[100]	[100]		[100]

Numbers show the gap with the middle income quintile associated with each group of factors in percentile scores. Numbers in brackets show the percentages of the overall raw gaps associated with each group. Gaps for the second and fourth income quintiles estimated but not shown. N = 7960.

Figure 7: Decomposition of the gaps: Literacy outcomes

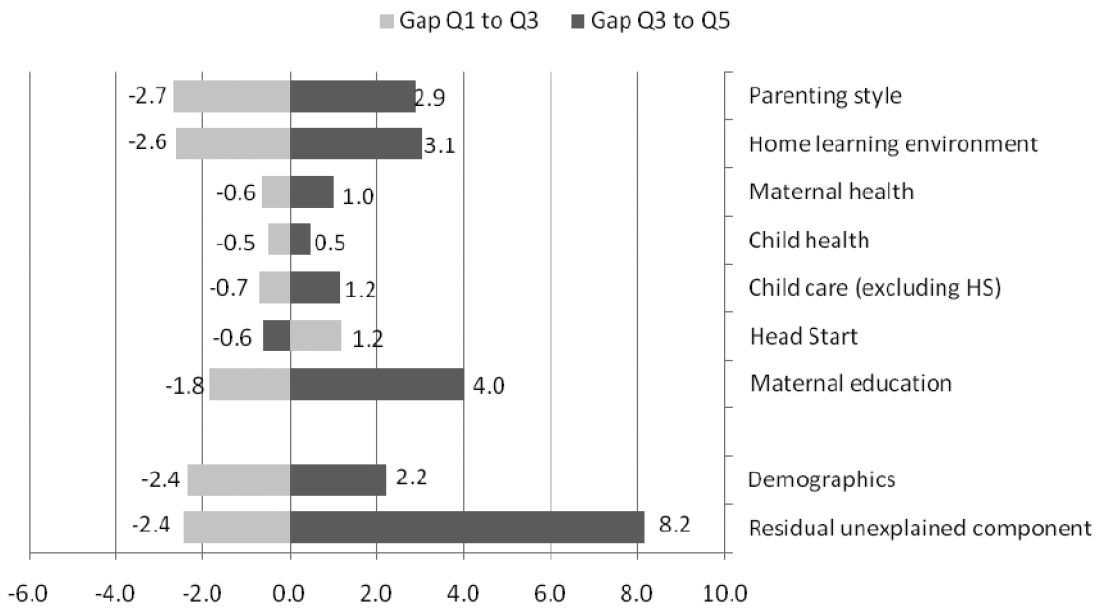


Figure 8: Decomposition of the gaps: Mathematics outcomes

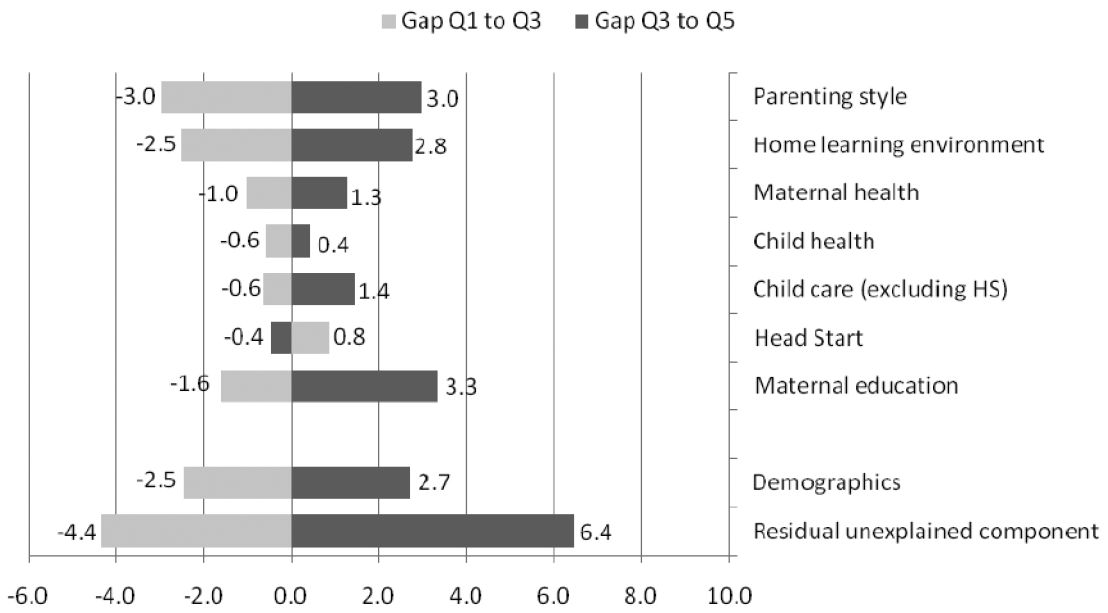
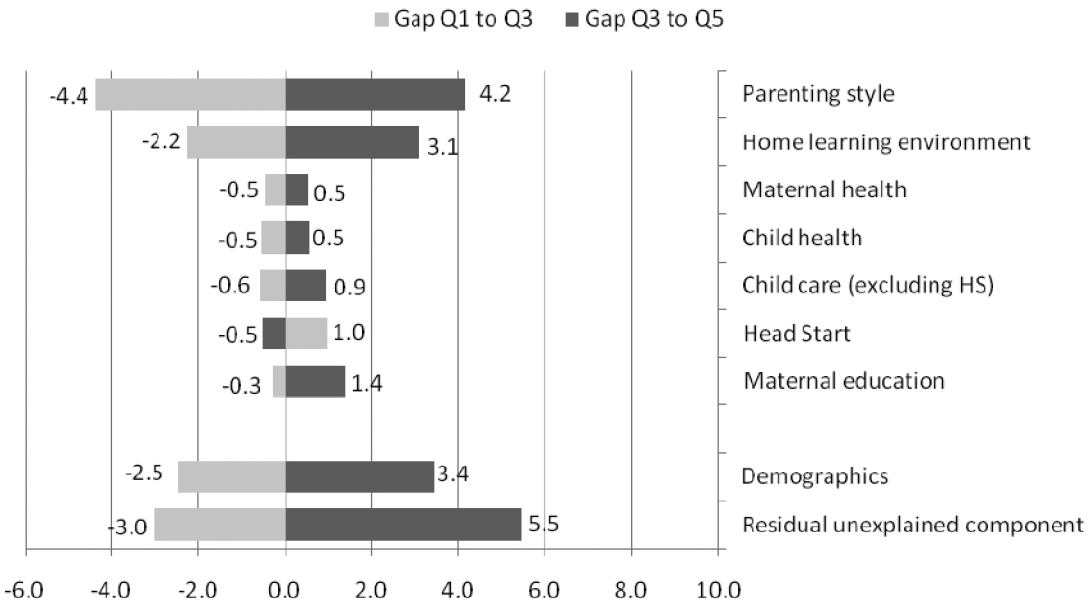


Figure 9: Decomposition of the gaps: Language outcomes



Parenting

Parenting differences between low- and higher-income families have been well-documented (see e.g. Hart and Risley, 1995; Lareau, 2003), and they are associated with sizable differences in cognitive development in our analyses as in prior research (see reviews by Desfarges, 2003; Brooks-Gunn and Markman, 2005). We consider two different parenting constructs: *parenting style and the home learning environment.*

Parenting style emerges as the single largest domain explaining the poorer cognitive performance of low-income children relative to middle-income children, accounting for 19% of the gap in mathematics (2.98 points of the 15.56 point gap), 21% of the gap in literacy (2.67 points of the 12.68 point gap), and 33% of the gap in language (4.38 points of the 13.31 point gap) (Table 5). A particularly important factor included in the parenting style domain is maternal sensitivity and responsiveness (what is sometimes called nurturance).[13] Developmental psychologists have long emphasized the importance of sensitive and responsive parenting for child development (see discussion in Bornstein, 1989; Shonkoff and Phillips, 2000; Waldfogel, 2006), and our detailed analyses (shown in Appendix Table 1) indicate that this one aspect of parenting style accounts for 11% of the gaps in literacy and math between low- and middle-income children, and 21% of the gap in language skills between these two groups.

[13] Other aspects of parenting included in this domain are knowledge of infant development, discipline, and rules; see Appendix Table 1.

The *home learning environment* is the second most important set of factors in explaining income-related gaps in school readiness. This domain is related to parenting style and we therefore include it under the overall rubric of parenting (following Brooks-Gunn and Markman, 2005). The home learning environment includes parents' teaching behaviors in the home as well as their provision of learning materials and activities, including books and CDs, computer access, TV watching, library visits, and classes. Together these aspects of the home learning environment account for between 16 and 21 percent of the gap in cognitive school readiness between low-income children and their middle-income peers (Table 5). Which particular factor matters most within this domain depends on the particular outcome. For instance, computer access explains 9% of the gap in literacy and math, but is less important for language (Appendix Table 1).

Of course, measures of parenting may at least in part reflect other differences between parents. Our models include controls for many other factors that are likely to be correlated with both parenting and child outcomes – factors such as maternal age, education, race/ethnicity, family size, and marital status. However, we do not have a control for maternal cognitive ability and our measures of parenting may in part be picking up the influence of that omitted factor.[14] At the same time, it is possible that poor-quality parenting is more detrimental for disadvantaged children or children who face other risks. If so, our results might under-estimate the influence of parenting in accounting for these gaps.

Maternal health and health-related behaviors, and child health

In common with prior research (see e.g. Currie, 2005), we find that income-related differences in *maternal health and health-related behaviors* – including smoking, breastfeeding, prenatal care, depression, obesity, and overall health – play a role in explaining current gaps in school readiness. However, the amount of the gap accounted for by these factors is much smaller than for parenting style or the home learning environment. Taken together, these maternal health and health-related behaviors account for only 4% to 7% of the gap in cognitive outcomes between low-income and middle-income children (Table 5). These figures may be an under-estimate if maternal health and health-related behaviors have stronger effects on low-income children than children overall.

Disparities in *child health* are a well-documented source of disparities in school achievement (see reviews in Currie and Madrian, 1999; Currie, 2005; Case and Paxson, 2006). Our analyses indicate that such disparities account for about 4% of the gap in school readiness between low-income and middle-income children in the US (Table 5). This figure is likely to be an under-estimate, because poor health may have a stronger effect on school achievement for low-income children than for

[14] In considering the influence of parental cognitive ability, it is important to keep in mind that although intelligence is fairly highly heritable at the *individual* level, this does not mean that *group* differences in cognitive ability are due to genetic differences (see discussion in Flynn, 2007). In addition, there is evidence that intelligence is less heritable – and influenced more by environmental factors – in low-income families, presumably because the resources that would allow for the full expression of children's genetic potential are less available than they are in more advantaged families (see Turkheimer et al., 2003).

their higher-income peers (see discussion in Case and Paxson, 2006). Nevertheless, in common with prior research (e.g. Currie, 2005; Reichman, 2005), we find that differences in child health are not a major factor in explaining gaps in school readiness.

Early childhood education and care

Given that the US has a largely private market in early childhood education and care (see e.g. Kamerman and Waldfogel, 2005), it is not surprising that large gaps in enrollment exist between lower-income and more affluent children. As Esping-Anderson (2004) points out, in the absence of a publicly funded system, lower-income families will be constrained in their child care choices, while more affluent families will use their additional income to purchase higher-quality care and education. We consider two major domains of early childhood education and care: *Head Start* (a compensatory education program targeted to low-income children), and *all other types of child care.* Our estimates confirm prior research that finds low-income children less likely to be enrolled in school or center-based settings, although they are more likely to be in Head Start (see e.g. Meyers, Rosenbaum, Ruhm, and Waldfogel, 2004; Barnett and Belfield, 2006).

Our analysis shows that, although low-income children's enrollment in Head Start serves to narrow gaps in school readiness, their lower rates of enrollment in other types of beneficial preschool programs serve to widen gaps in school readiness. Differential enrollment in child care (other than Head Start) accounts for between 4% and 6% of the cognitive gaps between low-income and middle-income children; differential enrollment in Head Start, in contrast, *reduces* current gaps between low- and middle-income children by between 6% and 9% (Table 5).

However, it is important to note that these figures do not tell us what role *future* early childhood education and care policies could play in closing school readiness gaps. The numbers cited above (and shown in Table 5) indicate how much gaps in school readiness would close if children from the lowest quintile had the same enrollment pattern as children from the middle quintile have *currently.* But certainly more ambitious reforms could be modelled. For instance, we might ask how much of the school readiness gap would be closed if *all* low-income children were moved into Head Start or into pre- kindergarten programs. Our estimates suggest that such reforms could close the gaps in school readiness between low-income and middle-income children by 20 to 50%.[15]

Even these numbers may still be under-estimates, because, as noted earlier, our models assume that the returns to enrollment in such programs are the same for all children. Prior research suggests that low-income children benefit more from high-quality programs than do their more advantaged peers (Magnuson and Waldfogel, 2005), and we find that to be the case in our data as

[15] Specifically, our estimates suggest that enrolling 100% of children in the bottom income quintile in Head Start would raise their literacy scores by 2.6 points (closing 20% of the gap with middle-income children). Enrolling 100% of children in the bottom income quintile in prekindergarten would raise their literacy scores by 6.2 points (closing 49% of the gap with middle-income children). Magnuson and Waldfogel (2005) carry out similar estimates focused on racial/ethnic test score gaps.

well.[16] If we allowed for children in the lowest income quintile to have larger returns to Head Start or prekindergarten than do children overall, the amount of the gap in school readiness that would be closed by enrolling all low-income children in these programs would be somewhat larger.

A further caveat is that we do not have very good data on the quality of the programs in which children are enrolled. We know that program quality is uneven and that low-income children often attend low-quality care (Meyers et al., 2004). If quality improvements were implemented in early childhood care and education programs, the returns to them – and the share of the gap they would close – would be higher (Magnuson and Waldfogel, 2005). However, we acknowledge that achieving quality improvements in programs serving large numbers of children may be difficult, as well as costly.

Parental education

Consistent with prior research, maternal education emerges as a moderately important factor, explaining 10 to 15% of the gaps in literacy and math readiness between low- and middle-income children in our analysis (but only 2% of the language gap) (Table 5). It is important to note, however, that some of what is attributed to maternal education in models such as we have estimated here is likely to reflect the influence of other variables not measured in the model (for instance, the mother's intelligence, or aspects of her family background such as family wealth). We can therefore not assume that equalizing maternal education, even if it were possible, would eliminate all of the gap attributed to this factor.

Other demographic differences

With such detailed controls in the model for what parents do and for parental education, it is perhaps not surprising that other demographic differences (in race/ethnicity, family structure, nativity, family member disability, maternal age at birth, number of children in the household, and child gender) play a fairly limited role in explaining income-related gaps in school readiness. These other demographic factors combined explain 16 to 19% of the gaps between low-income children and their middle-income peers (Table 5). The specific demographic factors that matter vary somewhat depending on which cognitive outcome we consider. The most consistent effects are those associated with differences in family size, which account for between 6 and 12% of the gaps in cognitive outcomes between low-income and middle-income children (Appendix Table 1).

[16] When we re-run our models including only the children in the bottom two income quintiles, preschool and prekindergarten programs have a larger effect on cognitive outcomes than they do in the models for the sample overall. The same is true for Head Start.

Residual (unexplained) component

Even with the inclusion of many controls for the factors discussed above (as well as dummy variables for missing data), sizable income-related differences in school readiness remain. For literacy, 19% of the gap in scores between the lowest-income and middle-income children remains even after controlling for all the other factors discussed above; the same is true for 23% of the gap in language and 28% of the gap in math (Table 5).

A large literature has attempted to discern to what extent these types of income differences are causal (see e.g. Mayer, 1997). One consistent finding is that to the extent income does causally affect child health and development, its influence appears to be strongest in early childhood, perhaps because most of what children experience in those years occurs in the home or in settings close to home selected by their parents (whereas older children spend more time in school and with peers) (see e.g. Duncan and Brooks-Gunn, 1997).

In the absence of experimental data, we can not assume that all of the remaining income differences we find are caused by income. It is likely that at least some portion of what is attributed to income in our models reflects differences in omitted characteristics or experiences that are correlated with income but not caused by it. As mentioned earlier, one important omitted factor is parental cognitive ability. However, it is also likely that some portion of the residual difference does reflect a causal effect of income, perhaps operating through mechanisms such as parental stress or material hardship.

3. What role can policies play?

This section focuses on the major policy levers that might reduce inequality in school readiness, taking into account what we know about the sources of inequality in early childhood as well as the likely effect of specific policies. Implicit in the analysis is the idea that in order to reduce gaps in school readiness, policies 1) must be effective in addressing factors that are consequential in explaining the gaps and 2) must do more to improve the performance of disadvantaged children than advantaged children (either because policies are targeted to disadvantaged children, or because policies provided universally close gaps in access to beneficial services or provide services that have a larger impact on the disadvantaged than the advantaged).

With this framework in mind, we now discuss each of the major early years policies that show promise to effectively address one or more of the factors that contribute to gaps in school readiness. To organize the discussion, we distinguish between five broad categories of programs: programs that provide support to parents during pregnancy and early childhood; programs that combine parent support and early child care and education for children age 0 to 2; early child care and education programs for children age 0 to 2; preschool programs for 3 and 4 year olds; and policies to raise the incomes of low-income families with young children (age 0 to 5). We also

include a brief discussion of the role that school and higher education policies could play in closing parental education gaps among parents of young children.

It is important to keep in mind that effective programs may address multiple factors. For this reason, we organize our discussion by type of program, rather than by domain or factor addressed.

Programs that provide support to parents during pregnancy and early childhood

Although home visiting programs as a group have had a mixed record of success, one specific program – the *Nurse-Family Partnership* program based in the US (but now being piloted in the UK) – has been shown in a series of randomized trials to be successful in meeting its goals of improving prenatal health, reducing dysfunctional care of children early in life, and improving family functioning and economic self-sufficiency. The program provides nurse home visiting to low-income first-time mothers, delivering about one visit per month during pregnancy and the first two years of the child's life. The program has been shown to improve nutrition and reduce maternal smoking during pregnancy, reduce preterm births, promote heavier birthweight, and also to reduce child abuse and neglect, as measured by reports of abuse or neglect, hospital emergency room visits for infants, and the number of visits specifically associated with an injury or ingestion (Olds et al., 2007). The program has also been found to improve parenting, increasing responsive and sensitive parenting as well as the quality of the home learning environment and parents' literacy activities, gains that have been translated to small improvements in behavioral and cognitive outcomes, but with larger effects for high-risk children (Olds et al., 2007).[17] Finally, the program also improves family functioning, delaying and reducing subsequent births to the first-time mothers served and increasing subsequent maternal employment (Olds et al., 2007). The success of this program, in contrast to other home visiting programs, has been attributed to the fact that it has developed a manualized intervention and that it uses highly trained nurses to deliver it. Cost-benefit analyses have found that the program, which currently costs $9,500 per family (Olds et al., 2007), saves on average $17,000 per family, with larger effects for high-risk families than lower-risk ones (Aos et al., 2004; see also Karoly et al., 1998; Karoly, Kilburn, and Cannon, 2005).

Similarly, although parent support and parent education programs often have weak results, some well-designed and intensive programs have proved effective (in randomized trials) at improving specific aspects of parenting and/or specific child outcomes. One parenting program with a strong evidence base is the *Incredible Years* program, which provides parent training for families with severely behaviorally disordered children. Such children are a small share of the population, but can be very disruptive both at home and in school settings. Incredible Years uses videotapes to teach parents how to manage difficult behavior and has been found to improve parents' ability to

[17] Following the usual practice in the psychology literature (see Cohen, 1988), I use the term small to refer to effect sizes of 0.20, moderate to refer to effect sizes of 0.50, and large to refer to effect sizes of 0.80. The effect size is calculated by dividing the change associated with the program by the standard deviation of the outcome being considered.

manage their children's behavior and to lead to improvements in both conduct disorder and attention (see e.g. Webster-Stratton, 1994; Sonuga-Barke et al., 2001; Jones et al., 2007). Positive impacts on behavior have also been found for the *Triple P-Positive Parenting Program* which like Incredible Years trains parents to better manage children's behavior (Sanders, 1999).

Another promising program – the *Play and Learning Strategies (PALS) program* – provides in-home training to parents of infants and toddlers focused on improving parents' responsiveness and sensitivity. The infant program includes 10 sessions; the toddler program is 12 sessions; and both programs use videotapes as a training tool. PALS has been found to substantially improve parents' responsiveness and sensitivity, their verbal encouragement of children, and their ability to maintain children's interest in activities, and these improvements in turn are reflected in small to moderate improvements in children's attention, use of language, and vocabulary scores (Landry, Smith, and Swank, 2006; Landry, Smith, Swank, and Guttentag, in press; Landry, 2008).

There are also some literacy programs that have been shown to increase parents' literacy activities with children and to improve children's literacy outcomes. In the UK, for instance, the *PEEP (Peers Early Education Partnership) program* aims to foster reading readiness by providing parents with age-appropriate materials and supporting them in using the materials through either group sessions or home visits. A recent matched control study found that although children receiving PEEP started out with lower levels of literacy skills at age 2, they made greater gains than the control group on several measures of cognitive development between age 2 and age 4 or 5; they also had higher levels of self-esteem at age 5 (Evangelou, Brooks, Smith, and Jennings, 2005; see also results from an earlier study finding cognitive gains, in Evangelou and Sylva, 2003). The group who developed PEEP are now experimenting with additional models of service delivery. To reach parents who may not participate in formal programs, they are piloting a drop-in program delivered in a shopping center (see Evangelou, Smith, and Sylva, 2006). Another new program combines the Incredible Years intervention for behavior problems with an intervention designed to promote parents' support for reading; results from an experimental study find a significant effect of the intervention on parents' reading activities as well as children's reading and writing skills (Sylva et al., in press).

In terms of health- and nutrition focused programs, the *Special Supplemental Program for Women, Infants, and Children (WIC)* provides nutritional advice as well as help in purchasing healthy foods to low-income pregnant women and women with young children in the US. Although not all studies agree, the weight of the evidence indicates that WIC reduces low birthweight and improves child nutrition (see Bitler and Currie, 2005; see also review in Currie, 2003, 2006).[18] Since the WIC program is a capped appropriation (rather than an entitlement), there is scope for improving child health by expanding funding for WIC so that it covers all low-income children.

[18] Among other benefits, WIC provides infant formula, which may reduce breastfeeding. However, as Case and Paxson (2006) discuss, for those women who would not have breastfed anyway, the provision of formula benefits children by delaying the introduction of cow's milk and solid foods.

Smoking cessation programs for pregnant women are another promising policy. Randomized trials have shown that such programs reduce maternal smoking and also result in fewer low birthweight and preterm births (see reviews in Lumley, Oliver, Chamberlain, and Oakley, 2004; Case and Paxson, 2006).

Also relevant here are recent UK policy initiatives providing more income support to pregnant women and women with newborns through increased *maternity grants* and *baby grants* and extensions in the period of *paid maternity leave.* Although these initiatives have not yet been evaluated, prior evidence suggests that they should lead to improvements in maternal health and child health and development (see review in Waldfogel, 2004, 2006).

Programs that combine parent support and early child care and education (for children age 0 to 2)

Although prior comprehensive child development programs for low-income families with young children have had disappointing results, two relatively new programs – Early Head Start in the US and Sure Start in the UK – have shown some success in improving child health and development by providing comprehensive services to low-income families. Both programs combine parent support with early child care.

Early Head Start, established in 1995 as an extension of the long-established Head Start program for 3 to 5 year olds, is designed for low-income children age 0 to 2 and supports a variety of service delivery models including home-based parent support programs, center-based child care programs, and mixed-approach programs that combine parent support and child care. Early Head Start remains a small program, currently serving only 3 percent of eligible children in this age group (Schumacher and DiLauro, 2008). A random assignment study found that Early Head Start improved the quality of parenting (as measured by the emotional and support for learning subscales of the HOME) and also improved child test scores, behavior, and health, with the strongest effects generally found for the mixed-approach programs (Love et al., 2005). The magnitude of these gains was generally small, and a cost-benefit analysis has found that the cost of the program exceeds the benefits that have been documented to date (Aos et al., 2004). Nevertheless, Early Head Start is a potentially promising program and one that merits further development and experimentation.

Sure Start, begun as a pilot program for families in the lowest-income areas in 1999 and quickly expanded to other low-income communities, provides comprehensive services to families with children age 0 to 3. Sure Start is a community-based program – anyone residing in a Sure Start area can receive its services – and communities have a good deal of latitude in what services they offer, although all programs offer some core services such as outreach and home visiting as well as some child care (National Evaluation of Sure Start (NESS), 2008). Some Sure Start programs are led by health agencies and have a strong health focus, while others are led by social services agencies and have a stronger social services focus. Programs also vary in the extent to which they have emphasized the provision of center-based child care above and beyond what is already

offered.[19] Since children were not randomly assigned to Sure Start, it has proved challenging to evaluate, and results from several rounds of evaluation studies have not always been consistent (see overview in NESS, 2008). However, the most recent evaluation evidence on established Sure Start programs – using propensity score matching to compare outcomes at age 3 for children in Sure Start areas to outcomes for children from non Sure Start areas – indicates that Sure Start is associated with improvements in 7 of 14 outcomes assessed, including improvements in two aspects of parenting (reductions in negative parenting, improvements in the home learning environment), three aspects of child behavior (social development, positive social behavior, independence/self-regulation), and two health outcomes (increases in receipt of recommended immunizations, reductions in accidental injuries) (although these two health effects may in part reflect over-time improvements rather than program effects) (NESS, 2008).

As part of the UK's Ten Year Childcare Strategy (see HM Treasury et al., 2004), Sure Start programs are now part of a broader initiative to have children's centers in every local community. These centers continue to offer Sure Start services to low-income families but also serve as a hub for child care and other services for young children and their families.

Early child care and education (for children age 0 to 2)

Programs that focus primarily on delivering early child care and education to infants and toddlers have received less attention than the parent support or comprehensive programs for this age group, or preschool programs for slightly older children. In part, this reflects the strong preference that many parents in both countries have for parental care or informal child care for children in this age group, as well as the sense of many practitioners and policy developers that programs for young children should support parents as well as deliver child care and education. The limited provision for this age group also likely reflects the often contested evidence as to how early child care and education affects children age 0 to 2. In particular, while studies have shown that high-quality child care and education for infants and toddlers raises cognitive achievement, studies have also found associations between early and extensive child care and child behavior problems, particularly when care is of low-quality (see review in Waldfogel, 2006).

Useful policies in this area, then, would focus on improving the access of low-income children to high-quality care and education, by providing more support for low-income children to attend high-quality care and education and by implementing measures to improve the quality of care and education available to them (Waldfogel, 2006). As mentioned earlier, improving quality is challenging. In the US, there is a good deal of interest in *quality-contingent child care subsidy programs,* which provide higher subsidies for low-income families who use higher quality care and education. In both countries, there is interest in raising *regulatory standards* for early child care and

[19] It is important to note in this regard that all 3 and 4 year old children now have access to a free part-time nursery place as part of the UK's universal child care initiative.

education and in monitoring those settings more carefully. The UK is also piloting the expansion of *high-quality child care and education centers targeted to low-income 2-year-olds.*

One challenge to be grappled with here is whether such programs should be targeted to low-income children or available more universally. For this age group, given the limited amount of resources currently available to this sector (and in light of the strong preferences many families have to arrange their own care), it probably makes sense to focus on expanding quality-contingent support for low-income families, alongside continued efforts to improve the quality of provision for children in this age group.

Preschool programs (for children age 3 and 4)

For 3 and 4 year olds, there is strong evidence to support expansions in the US *Head Start* and *prekindergarten* programs, both of which have been shown to improve school readiness in rigorous studies. Studies of Head Start include: the recent random assignment study, which found that Head Start resulted in small gains in child cognitive development, behavior, and health (Puma et al, 2005; see discussion in Gormley, 2007; Ludwig and Phillips, 2007); two recent regression discontinuity studies, one of which found long-run health and educational benefits for children likely to have benefited from program expansions in the 1960s (Ludwig and Miller, 2007) while the other documented long-run health and behavioral benefits for a more recent cohort of children (Carneiro and Ginja, 2008); and several studies using sibling comparisons to establish long-run causal effects on outcomes such as increases in high school graduation and reductions in crime (Currie and Thomas, 1995, 1999; Garces, Thomas, and Currie, 2002). Studies documenting cognitive benefits of prekindergarten programs (with generally larger effects for disadvantaged children than for advantaged peers) include several state-level studies using regression discontinuity methods (Gormley and Gayer, 2005; Gormley, Gayer, Phillips, and Dawson, 2005; Wong, Cook, Barnett, and Jung, 2007) as well as observational studies using national data and rich controls (Magnuson, Meyers, Ruhm, and Waldfogel, 2004; Magnuson, Ruhm, and Waldfogel, 2007a and b). Head Start programs are on average more expensive than prekindergarten programs ($7,700 per child as compared to $3,500 per child, according to Gormley, 2007), in large part because prekindergarten programs often operate only part-day and only during the school year. However, gains in cognitive achievement associated with prekindergarten tend to be larger than those associated with Head Start, probably because prekindergarten programs are operated by school departments (or supervised by them) and are staffed by teachers.

Here, as with younger children, the question arises as to whether such programs should be targeted to low-income children or available more universally. While we favor a targeted approach for younger children, we think the case is strong in favor of universal provision for 3 and 4 year olds. Evidence on state prekindergarten programs makes a compelling case that these programs can deliver high-quality services that promote school readiness, and with larger effects for disadvantaged children (see e.g. Magnuson et al., 2004). For this reason, we would emphasize

universal provision of half-day prekindergarten for 3 and 4 year olds, retaining the Head Start program (with some quality improvements; see Currie and Neidell, 2003) to provide supplemental care and education services for low-income 3 and 4 year olds, as well as services for younger low-income children (through the Early Head Start program). We recognize that public funding for two years of prekindergarten for all children would be costly; however, all available evidence suggests that the benefits would more than outweigh the costs (see e.g. discussion in Gormley, 2007). An interim step would be to fund and provide universal prekindergarten to all 4 year olds, while ensuring that all low-income 3 year olds have access to either prekindergarten or Head Start. Another option would be targeting within a universally available program, using a sliding fee scale.[20]

The UK, of course, already provides universal nursery education for 3 and 4 year olds and is working on improving the quality, availability, and affordability of its provision as part of its Ten Year Childcare Strategy (HM Treasury et al., 2004). However, challenges remain (see discussion in Butt, Goddard, La Valle, and Hill, 2007; Waldfogel and Garnham, 2008). The quality of care in this sector still leaves much to be desired, and there is still evidence that low-income children are less likely than their higher-income peers to take advantage of the provision. There are also some questions as to whether the free offer is really free, with some parents reporting that they are paying for care that should be provided free under the universal nursery offer. There is also still the challenge of providing good-quality child care during the hours that parents are working and children are not in nursery care, particularly when parents work irregular or non-standard hours. Child care subsidy funding has been greatly expanded but low-income parents still report difficulty in finding affordable care. Policy recommendations to address these problems include: setting higher quality standards; expanding wrap-around care (that combines child care with the part-time nursery provision); developing new models of care for families where parents work irregular and non-standard hours; and increasing the generosity and ease of accessing child care subsidies for the lowest-income families (see e.g. Waldfogel and Garnham, 2008).

Also worth consideration is whether it might be worthwhile to more tightly link nursery provision with the primary schools, so that nursery programs for 3 and 4 year olds are either delivered in the schools or are supervised by them, as is the case with prekindergarten in the US. This is already happening in the UK, but further moves toward having nursery programs more tightly linked to schools, and indeed having more such programs located at the schools, would be a useful next step, as it would serve to align the preschool and primary schools curricula and also raise standards for teachers in the nursery sector. At the same time, it would free up some existing community-based child care programs to provide more services to the under 3s.

[20] Duncan, Ludwig, and Magnuson (2007) propose a sliding fee system whereby poor families would receive the program for free, near-poor families would pay one-third of the costs, moderate income families would pay two-thirds of the costs, and more affluent families (the top 40% of the income distribution) would pay the full costs.

Policies to raise the incomes of poor families

US and UK policies differ in this area (see discussion in Waldfogel, 2007). In the US, unconditional cash supports for low-income families with children have been curtailed, and the largest single income transfer program for low-income families is now the work-conditioned Earned Income Tax Credit (EITC). As a result, in the decade following welfare reform, the only low-income families who saw income gains were those where parents moved into the labor market or increased their work hours (or earnings). In the UK, in contrast, work-oriented welfare reform is just one part of a multi-pronged anti-poverty initiative, which also includes increases in unconditional cash benefits for families with children, with particularly large increases in both universal child benefits and means-tested income support for young children.

While it is too soon to tell the impact of these reforms on child health and development, analyses of expenditure data reveal striking differences across the two countries. In the US, where income gains have been tied to increased work, low-income families are spending more money on work-related items – such as adult clothing and transportation (Kaushal, Gao, and Waldfogel, 2007). In the UK, in contrast, where all low-income families with children have seen income gains in the form of increased child-related benefits (regardless of whether parents are working), low-income families are spending more money on child-related items – such as children's clothing, and books and toys – while reducing their spending on alcohol and tobacco (Gregg, Waldfogel, and Washbrook, 2005, 2006).

Given the sizable income gaps seen among families with young children, there is certainly scope for further income supports for low-income families. This is particularly true in the US, where such income supports are less generous and where income gaps are wider. The evidence from the UK's recent reforms is promising, in that it suggests that when benefits are labelled as being for children, parents do spend the increased income on the children.[21]

Policies to close gaps in parental education

There is also a considerable role for policy to play in promoting the education of the next generation of parents, as well as in attempting to redress inequality of education in the current generation. In the US, a good deal of attention is focused currently on reducing achievement gaps for students in primary and secondary school and in improving high school graduation rates (see e.g. Murnane, 2007). Such initiatives if successful would go a long way toward narrowing the gap in parental education in the next generation, as Brian Jacob and Jens Ludwig discuss in their paper for this summit. But they are not sufficient. Given the increased demand for skill in the labor market, a high school education is no longer adequate to ensure that parents can support a family above the poverty line. Therefore, further efforts to increase the college enrollment and completion

[21] There is also promising evidence from US welfare to work experiments, showing that when such policies raise the incomes of families with preschool age children, those children make gains in school achievement (Morris et al., 2001).

of low-income youth are also needed, as Sarah Turner discusses in her paper. Similarly in the UK, policy initiatives to raise the school leaving age are certainly welcome, but must be pursued in tandem with efforts to raise the share of low-income youth going on to higher education.

4. Conclusion

In their quest to close income-related gaps in school achievement, researchers and policymakers have begun to focus more attention on the sizable income-related gaps in school readiness that exist even before children enter school. Our analysis of contemporary birth cohort data from the US and UK suggests that this attention is warranted. In both countries, sizable income-related gaps in cognitive development are already apparent in early childhood -- before children start school.

Our analysis also sheds some light on what factors account for these gaps. Income-related differences in parenting style and the home learning environment appear to be the most consequential, together accounting for between a third and a half of the income-related gaps in cognitive performance between low-income and middle-income children in our decomposition using the US data. Other explanatory factors include differences in maternal health and health behaviors, child health, early childhood care and education, maternal education and other demographic differences, and income itself.

What policy levers could most effectively address these gaps in the early years? The good news here is that a number of promising programs have been shown to effectively address one or more of these factors. For instance, in the parenting domain, high-quality home visiting or parent training programs such as the Nurse-Family Partnership, PALS, and PEEP have been shown to be effective at improving parenting style and the home learning environment. Both Early Head Start and Sure Start, while posting somewhat modest effects, nevertheless have out-performed earlier efforts at comprehensive early child development programs. And, the track record for preschool programs (such as Head Start and prekindergarten in the US) is quite strong, and our estimates suggest that expansions in those programs could make a substantial difference in narrowing the income-related gaps in school readiness that we have documented. Also good news is that the most effective programs often improve more than one set of factors. Some of the best parenting programs, for instance, also improve child health or maternal health behaviors (see, e.g., the evidence on the Nurse-Family Partnership).

Of course, policymakers need to know not just what programs are effective, but what their relative costs and benefits are.[22] Some programs that are effective in improving outcomes for

[22] See e.g. Karoly et al. (1998), Aos et al. (2004), and Karoly, Kilburn, and Cannon (2005) and also Brooks-Gunn, Magnuson, and Waldfogel (2008) who develop and apply a two-step method for estimating the long-run benefits of early childhood interventions when long-run program data are not available.

disadvantaged children have also been found to be cost-effective (i.e. to return more in benefits than they cost), but others have not. Moreover, many programs have not had cost-benefit analyses because information to do so has been lacking. A full cost-benefit analysis is beyond the scope of this paper but would be a useful next step.

In the meantime, the analysis in this paper points to several very promising directions for policymakers to consider. Among these we would place the highest priority on 1) expansions in parenting-oriented programs, including those that target several aspects of parenting alongside other domains (programs such as the Nurse-Family Partnership) as well as those that focus more narrowly on specific aspects of parenting related to school readiness (programs such as PALS and PEEP); 2) continued efforts to develop and improve programs such as Early Head Start and Sure Start that have the potential to combine high-quality child care and family support for low-income children age 0 to 2; and 3) expansions in high-quality preschool programs for 3 and 4 year olds, housed in the schools or linked to them.

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Appendix Table 1: Detailed decomposition of the US income gradients in preschool outcomes

	Language		Literacy		Mathematics		Behaviour	
	Q1	Q5	Q1	Q5	Q1	Q5	Q1	Q5
Total parenting style	**-4.38**	**4.15**	**-2.67**	**2.87**	**-2.98**	**2.96**	**-1.13**	**1.57**
Maternal sensitivity/responsiveness	-2.74	2.59	-1.44	1.38	-1.75	1.59	-1.46	1.41
Knowledge of infant development	-1.24	0.99	-0.74	0.59	-0.86	0.69	0.88	-0.70
Spanking	0.00	-0.01	-0.02	0.15	-0.04	0.13	-0.12	0.41
Rules	-0.40	0.59	-0.47	0.75	-0.34	0.54	-0.43	0.45
Total home learning environment	**-2.24**	**3.10**	**-2.62**	**3.05**	**-2.52**	**2.78**	**-3.08**	**5.04**
Home cognitive behaviors	-0.78	0.98	-0.81	1.03	-0.45	0.59	-2.01	2.41
Classes at age 4	-0.19	1.08	-0.20	0.84	-0.23	1.04	-0.53	2.09
Library visits	-0.20	0.31	-0.12	0.19	-0.07	0.11	0.01	0.00
Books & CDs	-0.54	0.28	-0.31	0.19	-0.35	0.24	-0.19	0.07
Computer access	-0.48	0.28	-1.11	0.54	-1.39	0.70	-0.29	0.12
TV watching	-0.04	0.17	-0.07	0.28	-0.03	0.10	-0.06	0.36
Total maternal health & health bhi	**-0.47**	**0.52**	**-0.65**	**0.99**	**-1.00**	**1.28**	**-2.06**	**2.29**
Smoking	-0.05	-0.24	-0.19	0.14	-0.48	0.27	-0.28	0.34
Breastfeeding	0.00	0.05	-0.15	0.19	-0.22	0.25	0.29	-0.29
Prenatal care	0.11	-0.04	0.00	0.00	0.12	-0.05	-0.04	0.02
Depression	-0.13	-0.01	0.00	-0.04	-0.15	0.13	-1.62	1.54
Maternal BMI	-0.34	0.69	-0.20	0.54	-0.24	0.62	-0.09	0.17
Maternal general health	-0.05	0.08	-0.11	0.17	-0.03	0.05	-0.33	0.52
Total child health	**-0.53**	**0.54**	**-0.48**	**0.48**	**-0.59**	**0.42**	**-1.34**	**1.18**
Child health at birth	-0.07	0.13	-0.09	0.15	-0.15	0.26	-0.07	0.09
Later child health	-0.46	0.42	-0.39	0.33	-0.43	0.15	-1.27	1.09
Total child care (excluding HS)	**-0.60**	**0.94**	**-0.72**	**1.16**	**-0.64**	**1.44**	**0.07**	**-0.05**
Child care pre-4 yrs	-0.20	0.12	-0.09	-0.02	-0.17	0.45	-0.04	0.09
Child care @ 4 yrs	-0.40	0.82	-0.62	1.18	-0.46	0.99	0.11	-0.14
Ever in Head Start	**0.97**	**-0.51**	**1.17**	**-0.62**	**0.85**	**-0.45**	**0.05**	**-0.03**
Mother's education	**-0.29**	**1.41**	**-1.85**	**4.00**	**-1.62**	**3.34**	**0.12**	**-0.95**

Language			Literacy		Mathematics			Behaviour
Q1		Q5	Q1	Q5	Q1	Q5	Q1	Q5
Total demographics	**-2.48**	**3.43**	**-2.36**	**2.22**	**-2.47**	**2.71**	**1.60**	**-1.35**
Black	-0.96	0.40	1.08	-0.45	-0.07	0.03	1.29	-0.53
Hispanic	-0.62	2.05	-0.21	0.68	-0.33	1.09	0.06	-0.20
Other race/ethnicity	0.05	-0.10	-0.16	0.22	-0.10	0.18	0.03	-0.04
Family structure	0.79	-0.39	-1.19	0.69	-0.61	0.28	0.16	-0.26
Mother foreign born	-0.49	0.31	-0.02	0.01	0.13	-0.08	0.10	-0.06
Family member disability	-0.19	0.09	-0.22	0.11	-0.38	0.19	0.03	-0.02
Mother's age at birth	-0.26	0.71	-0.21	0.23	-0.13	0.44	0.23	-0.25
# Under 18s in hhold @ 4 yrs	-0.83	0.48	-1.48	0.84	-1.00	0.68	-0.37	0.22
Child female	0.04	-0.11	0.04	-0.12	0.03	-0.09	0.07	-0.21
All missing dummies	**-0.26**	**0.03**	**-0.07**	**-0.03**	**-0.24**	**0.01**	**-0.06**	**-0.02**
Residual unexplained component	**-3.04**	**5.45**	**-2.45**	**8.15**	**-4.36**	**6.44**	**0.51**	**-1.39**
Total gap	-13.31	19.06	-12.68	22.27	-15.56	20.93	-5.32	6.30

Numbers in bold represent group totals. Numbers shown are percentile scores.

Improving Educational Outcomes for Poor Children

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1. Introduction

The achievement gap between poor and non-poor children in the US is obvious to even the casual observer. There is a voluminous research literature examining the magnitude of and trends in race and income achievement gaps in the United States, and the other papers presented at this conference explore these issues in depth. Hence, we will provide only a brief overview of achievement gap here.[1]

The National Assessment of Educational Progress, also known as the "Nation's Report Card" in the US, is perhaps the best source documenting differences in academic performance among different groups in the United States. The NAEP reports scores separately by the major racial classifications and by eligibility for free lunch, which is a reasonable but imperfect measure of poverty in the US context.[2] Table 1 presents statistics from the NAEP reading and math exams given to fourth graders (roughly 9-year-olds) in 2003 and eighth graders (roughly 13-year-olds) in 2007. In 2003, we see that the students eligible for free lunch (hereafter referred to as poor children) scored 22 (28) points lower in math (reading) than their peers who were not eligible for free lunch (hereafter referred to as non-poor children). The Black-White gap among fourth graders in 2003 is 27 (31) points in math (reading) and the Hispanic-White gap is only slightly smaller. Given that the standard deviation in scores is roughly 30 to 40 points (depending on the subject, grade and year), these gaps reflect a difference of between two-thirds and one standard deviation.

But how do these gaps change as children progress through school? Prior literature focusing on the Black-White test score gap in the US has found that somewhat the gaps in math and vocabulary widen by roughly .2 standard deviations between the first and twelfth grades, but the reading gap remains the same. However, there is mixed evidence with regard to how these trends vary across elementary, middle and high school (Phillips et al. 2008).

By comparing fourth graders in 2003 with eighth graders in 2007, we can obtain a rough sense of how the gaps widen for students in the US between the ages of 9 and 13.[3] In math, we see that more advantaged students tend to make greater gains between fourth and eighth grade, thereby increasing the gap by 4 or 5 points. However, given the greater variance in achievement among older students, the magnitude of the gap in terms of standard deviation units remains basically the same. If one focuses on the fraction of students attaining a standard of proficient or higher based on NAEP criteria, there are few changes in the gaps. Interestingly, in reading it appears that poor and minority children improve slightly relative to their more advantaged peers during the

[1] There are a number of technical test measurement issues involved in estimating the magnitude of the achievement gap, and the change in the gap throughout elementary and secondary schooling. For an excellent review of these issues, see Phillips et al. (1998).

[2] Since the correlation between race and economic status is quite stark in the US, the racial achievement gap also sheds light on the achievement gap between advantaged and disadvantaged children and hence we present information on these gaps as well.

[3] It is also possible to compare 4th and 8th graders in the same year (i.e., 2003 or 2007). When we do so, the conclusions remain the same.

later elementary grades. However, these gains are quite small relative to the magnitude of the initial gaps.

In summary, the data from the NAEP suggests that in the US the achievement gap between advantaged and disadvantaged students is quite large at age 9, and remains roughly constant

Table 1: Changes in the Achievement gap during Elementary School in the US, 2003–2007

		Math				
	Metric	Not eligible for free lunch	Eligible for free lunch	White	Black	Hispanic
4th Grade Achievement in 2003	Scale Score	244	222	243	216	222
	% at or above the proficient standard	45%	15%	43%	10%	16%
Change from 4th to 8th Grade (2003 to 2007)	Scale Score	47	43	48	43	43
	% at or above the proficient standard	-3%	0%	-1%	1%	0%
		Reading				
	Metric	Not eligible for free lunch	Eligible for free lunch	White	Black	Hispanic
4th Grade Achievement in 2003	Scale Score	229	201	229	198	200
	% at or above the proficient standard	42%	15%	41%	13%	15%
Change from 4th to 8th Grade (2003 to 2007)	Scale Score	42	46	43	47	46
	% at or above the proficient standard	-2%	0%	-1%	0%	0%

Source: National Assessment of Educational Progress

through age 13. This fact motivates the remainder of this paper, which assesses a range of schooling interventions that have been tried in the US.

Whether it is possible to improve the quality of schooling received by disadvantaged children, and if so, how, has been the source of considerable debate within the social sciences dating back to the mid-1960s. The 1964 Civil Rights Act required a study of inequality in educational opportunities "by reason of race, color, religion, or national origin," which in turn led to the most massive nationwide education data collection effort that had ever been attempted, led by the distinguished sociologist James Coleman. This landmark study revealed that most of the variation in student test scores is within, rather than across, schools. The Coleman Report also found that family background is the strongest predictor of academic achievement, and that most measurable school inputs – with the exception perhaps of a school's socio-economic composition – are weakly correlated with student outcomes. A series of disappointing evaluation studies of educational interventions subsequent to the Coleman Report contributed to the sense of pessimism (see for example Levin, 1977, Glazer, 1986, Jencks, 1986). But the past few decades have seen a dramatic improvement in the technology of education policy evaluation, including further improvements in data quality and quantum leaps in computing power, which has enhanced our ability to uncover moderately-sized program impacts within the complex environment that determines schooling outcomes.

The literature on educational interventions often seems to be dominated by contentious, highly ideological debates about what should guide school reform efforts – one of the most prominent being whether additional resources are required to improve student learning. The surprising findings of the Coleman Report contributed to a gradual shift over time from a focus on reforms that focus on increasing the inputs to schooling to those that emphasize improving the efficiency of schooling. A move to evaluating reforms on the basis of student learning accompanied this shift in focus.

In this paper, we consider a range of interventions that have occurred in US schools, assessing the extent to which they improve the schooling outcomes of children from disadvantaged backgrounds. The evidence available for making such judgments varies considerable from one area to another. In some cases, we consider the cost effectiveness of interventions (where they involve extra resources); in others, we discuss some lessons for how policies are actually implemented within schools. It is worth pointing out that due to space constraints, we do not consider all potential reform strategies. Perhaps the most notable omissions include policies aimed at equalizing school finances and those aimed at racial and/or socioeconomic integration.

Interventions

The first two interventions we consider – additional investments during the preschool years, and reducing class sizes in schools – can be classified as 'input-oriented approaches' as they involve the use of extra educational resources to improve educational outcomes. Pre-school interventions are considered in depth in another separate paper for the summit; here we offer alongside our review of school-based interventions an overall assessment of the impact of increasing the amount of formal education children receive before school.

Next we assess reforms that strive to change the school organization, curriculum, and teaching practices in very specific ways. These can be categorized as 'efficiency-oriented strategies' that operate at the school or classroom level – although they are in effect a hybrid approach insofar as many of these interventions require a modest amount of additional resources.

Other efficiency-oriented strategies target what one might describe as "macro" or "structural" aspects of schooling. These reforms do not prescribe specific practices, but rather seek to change the structure and/or incentives within which educators work, under the assumption that given the proper incentives and/or institutional arrangements, school administrators and teachers will be able to implement the reforms best suited for their particular needs. We consider the impact of efficiency-oriented strategies that relate specifically to the labor market for teachers. These aim to change the mix of teachers working in schools serving disadvantaged students, or to change the compensation offered to existing teachers.

Finally we turn to the evidence on two types of "output-oriented" approaches that also operate at the structural level. These include accountability policies, which aim to change the incentives under which educators operate without prescribing particular interventions. A different output-based approach falls under the broad rubric of school choice, which is meant to increase options for individual families and/or enhance the productivity of all schools through a competitive process whereby schools "compete" for students.

Conclusions

Our overall conclusion is one of tempered optimism. Rigorous research has identified several intervention strategies that seem capable of improving the schooling outcomes of disadvantaged children. Moreover, the available evidence provides some support for both input-and output-oriented approaches. For example, there is evidence that changing the incentives facing school administrators, teachers, and students can change behavior, although the unintended consequences of these incentives indicates that the design and implementation of accountability programs are crucial to their success. At the same time, research provides support for the idea that additional educational investments can improve student outcomes even without substantial changes to the structure or incentives of the existing K-12 schooling system. Reducing class sizes in the early grades seems like a promising intervention, assuming this can be done in a way that does not compromise teacher quality. Additional investments in disadvantaged children during

the preschool years also seem quite promising. While these interventions require additional resources, there is good reason to believe that the benefits, to the children themselves and to society as a whole, are large enough to justify the costs. An important question from a policy perspective is which of the policies discussed below should be prioritized, and whether certain combinations of policies might be best introduced simultaneously. While in many cases the available evidence does not provide us much guidance to these questions, when possible we comment on these issues below.

Our optimism is tempered by the recognition that even the most successful education policy interventions will reduce, but not eliminate, disparities in educational outcomes across lines of social class or race. The average achievement scores for minority students in the US lag behind white students by around one standard deviation; the gap between poor and non-poor children is roughly two-thirds to three-quarters of a standard deviation. Even the most successful education policy interventions described below would improve test scores by no more than about a quarter of a standard deviation, usually enough to pass a benefit-cost test but not enough to equalize educational opportunity for all American children. This is not a reason for despair, but does suggest that schooling interventions by themselves should never be seen as a panacea for addressing deeply entrenched social class inequalities in the US education system.

2. Early Childhood Interventions

A growing body of research in neuroscience, developmental psychology, economics, and other fields suggests that the earliest years of life may be a particularly promising time to intervene in the lives of low-income children (Shonkoff and Phillips, 2000, Carniero and Heckman, 2003, Knudsen et al., 2006). A growing body of research shows that early childhood educational programs are capable of generating impressive learning gains in the short-run and, in some cases, improving the long-run life chances of poor children. Moreover, the estimated benefits generated by these programs are large enough to justify the program costs.

The earliest evidence comes from two small, intensive intervention programs: Perry Preschool and Abecedarian. These programs provided high-quality preschool services to low-income families in the 1960s and 1970s. A key feature of these programs is that interested children were randomly assigned to a treatment group (children who were invited to participate in the program) and a control group (children who were not invited to participate in the program). The great advantage of the random assignment research design is that parents and children in the program can be expected, on average, to be similar at baseline to those randomly assigned to the control group (who do not receive the program benefits). In this case, differences in outcomes for treatments and controls can be attributed to the program, and not to some other factor that might be correlated with outcomes and program take-up. Researchers have followed children in both the treatment and control groups for many years. While there was some evidence that early program impacts on

cognitive ability faded out over time, researchers found important long-term benefits of participating in these programs in terms of employment, earnings, teen pregnancy and drug use (Schweinhart et al., 2005; Ramey and Campbell, 1979; Campbell et al., 2002; Barnett and Masse, forthcoming; Currie, 2001). Despite the high cost of these programs, it appears that the total economic value of the programs exceeded their costs (Barnett and Masse, 2007).

Evidence on the existing publicly funded early education programs, which illustrate what can be achieved for large numbers of children in programs of more variable quality, is also encouraging. A recent random-assignment evaluation of Head Start found positive short-term effects of program participation on elementary pre-reading and pre-writing skills equal to about 0.3 and 0.2 of a standard deviation respectively, although not on advanced skills in these two outcome domains (Puma et al. 2005).[4] Head Start participation also increased parent-reported literacy skills of children by around 0.45 of a standard deviation. The Head Start experimental study evaluated impacts separately for three- versus four-year-olds, given the possibility that program impacts might be larger for younger children. Statistically significant effects on other outcome domains were typically concentrated among three-year-olds, with effect sizes of 0.15 standard deviations for vocabulary and 0.20 standard deviations for problem behaviors. Effects on math skills were positive but not statistically significant. The effects for four-year-olds were positive, but not significantly different than zero. However, if one calculates Head Start impacts by pooling together the three- and four-year-olds in the experiment, the increased statistical power leads to significant program impacts on math scores and on almost all of the other main cognitive skill outcomes in the report (Ludwig and Phillips, 2007).[5]

More recently, several studies have examined the effects of newer state-initiated universal pre-K programs on children's test scores. These studies typically find short-run effects on achievement test scores that are slightly larger than those estimated for Head Start and, importantly, find that participation in the programs improves both language and math skills. The pre-kindergarten program in Tulsa, Oklahoma has been studied carefully by several researchers using a regression-discontinuity research design to account for selection bias in who chooses to participate in the program. Researchers found that program participation increased pre-reading and early math skills by 0.8 and 0.38 standard deviations respectively (Gormley et al., 2005; see also Gormley and Gayer, 2005). Other researchers recently applied a similar methodology to studying pre-kindergarten programs in five states, and found effects on receptive vocabulary and math of just over one-quarter of a standard deviation and effects on print awareness of nearly two-thirds of a standard deviation (Barnett, Lamy, and Jung, 2005).

[4] See Ludwig and Phillips (2007) for further discussion of these results and why the results presented above differ from Puma et al. 2005.

[5] Another program, Early Head Start, serves children under age three, in a mix of home and center-based programs. A rigorous evaluation of the Early Head Start program found some evidence that the program had positive effects on some aspects of children's development and parenting practices, but in general the effects were smaller than those produced by the Head Start program. See Love et al. (2002).

While both Head Start and state-sponsored pre-kindergarten programs appear to increase the cognitive skills of young children, it appears that the effects for the new pre-kindergarten programs are larger than those for Head Start. One possible explanation is that pre-K programs hire more qualified teachers, pay them more, and offer a more academically oriented curriculum than do Head Start programs. Another explanation is that the Head Start comparison group received more center-based care than did children in the pre-K comparison group.[6] A third possible explanation is that the recent Head Start study relies on a rigorous randomized experimental design.[7]

While the short-run achievement gains are impressive, the crucial question from a policy perspective is whether the effects of the large-scale early childhood education programs persist over time. In order to explore the longer-run impacts of such programs, one must rely on non-experimental studies of children who participated in Head Start several decades ago. While this work is necessarily subject to certain limitations, there are several studies of the long-run impacts of Head Start that are able to control for many potential confounding factors (Currie and Thomas, 1995, Garces, Thomas and Currie, 2002, Ludwig and Miller, 2007, Deming, 2007). These studies suggest lasting effects on schooling attainment and perhaps criminal activity, although test score effects appear to fade out over time. Like Abecedarian and Perry, these effects are large enough to generate benefits that likely outweigh the program costs.

Of course, it is possible that the long-term effects of Head Start on more recent cohorts of children may be different from those for previous cohorts of program participants because program quality changes over time or because the developmental quality of the environments that children would experience as an alternative to Head Start change. But the short-term test score impacts that have been estimated for recent cohorts of Head Start participants in the randomized experiment described above appear to be similar to what we see for earlier cohorts of children for whom we also now have evidence of long-term benefits. So there is room for cautious optimism that Head Start might improve the long-term outcomes for recent waves of program participants as well, even though this cannot be directly tested for many years.[8]

While there remains some uncertainty about what is the "best" early childhood program model and the extent to which the effects will persist, it seems clear that preschool interventions in general represent a promising way to improve the life chances of poor children. The influence of the preschool years on children's later achievement and success is not well reflected in current federal government budget priorities, which allocate nearly seven times as much money per capita for K-12 schooling as for pre-kindergarten (pre-K) early education and child care subsidies for three- to five-year-olds. Given the opportunities for profitable preschool investments in children's

[6] http://www.northwestern.edu/ipr/events/briefingdec06-cook/slide16.html

[7] A final explanation for the larger effects of pre-kindergarten involves the research design utilized in recent pre-k studies. While the recent research is considerably better than past work, they all utilize a regression discontinuity approach, which has several important limitations. It is possible that this research design is leading the authors to overestimate the benefits of these programs.

[8] See Ludwig and Phillips (2007) for additional discussion.

cognitive and socio-emotional development, current US spending is not well targeted. Most social policies are devoted to playing catch-up against children's early disadvantages, but disparities are already apparent among young children, and many disadvantaged children never catch up. Efforts to improve young children's school readiness with proven, high-quality programs should play a much more prominent role in America's anti-poverty strategy than they do today.

3. Class Size Reduction

An alternative way to improve student learning during the early grades is to reduce average class sizes, which may enable teachers to spend more time working with individual students, tailor instruction to match children's needs, and make it easier for teachers to monitor classroom behavior. Class size reductions are not cheap, however. Reducing class sizes requires hiring additional teachers and in some cases expanding a school's physical space. But the best available evidence suggests that class size reduction (CSR), holding teacher quality constant, can improve student outcomes by enough to justify these additional expenditures, with benefits that are particularly pronounced for low-income and minority children.

The best available evidence on the effects of CSR comes from Tennessee's Project STAR, which randomly assigned a total of 11,600 students in kindergarten through third grade (roughly ages 5 to 8) and 1,330 teachers to small classes (13-17 students), regular size classrooms (22-25 students), or regular size classrooms that also included a teacher's aide.[9] Importantly, teachers were randomly assigned to different classroom environments as well as students. This ensures that the average quality of teachers in small versus regular size classrooms is the same, a critical point to which we will return within the context of policy efforts to take CSR to scale.

Analysis of the Project STAR data suggests that class size reductions of around one-third during these early grades increased reading and math scores by around 0.12 standard deviations for whites and 0.24 standard deviations for blacks. These impacts seem to be driven by larger impacts on students attending mostly black schools, although even within such schools, black students seem to benefit somewhat more than do whites (Krueger and Whitmore, 2002). Similarly, impacts are somewhat larger for students eligible for the free lunch program.

Follow-up evaluations of STAR find long-term benefits of attending a small elementary school class. Researchers find that the test score impacts persist through 8th grade, although they decline by one-half to two-thirds (Achilles et al., 1993, Nye et al., 1995, Krueger and Whitmore, 2001). As with the short-term effects, the eighth grade test scores reveal larger gains among low-income and minority students. Moreover, black students in the treatment group were roughly 5 percentage points (or 15 percent) more likely to take a college entrance exam (i.e., the SAT or ACT) during high school (Krueger and Whitmore, 2001, 2002). Examination of other outcomes such as criminal

[9] This section is based on the excellent summary of Project STAR research by Schanzenbach (2006/7).

involvement or teen births yield point estimates that are in the direction of beneficial CSR impacts, but these are imprecisely estimated (Schanzenbach, 2007).

Figuring out whether STAR passes a benefit-cost test is complicated by the difficulty of calculating the value of test score gains that occur during the school years on longer-term life outcomes such as earnings, health, crime, citizenship and civic involvement, parenting quality, and so on. With this caveat in mind, the available evidence suggests that the test score gains induced by CSR in STAR are probably large enough to justify the costs, even when we focus just on the benefits that arise from test scores on future earnings alone (Krueger, 2003, Krueger and Whitmore, 2001, Schanzenbach, 2007).

The results from Project STAR are encouraging but it is important to keep in mind that they come from a controlled experiment that managed to hold the quality of teachers constant. A sobering example of the challenges of taking CSR to scale comes from the California experience. Based in part on the encouraging STAR results, California introduced a statewide initiative to reduce primary grade class sizes in 1998-99 (Borhnstedt and Stecher 2002; Jepsen and Rivkin 2002). The effort in California required schools to not only hire a large number of new teachers, but also find the physical space to house the new classrooms. The policy was implemented over a very short time period and was not accompanied by an increase in teacher salaries or funding for capital improvements. As a result, many low-income school districts found it difficult to hire qualified teachers, and had trouble arranging for adequate classroom space for the new classes. Jepsen and Rivkin (2002) argue that much of the potential benefit to CSR in California was lost due to reductions in average teacher quality, particularly in lower-income urban school districts.

California's experience suggests the complexity of taking education policy reforms to a large scale. In the specific case of class size reduction, it suggests that policymakers might focus their efforts on low-income districts or schools, and should make sure to implement the program in such a way to minimize any adverse effects on teacher quality or physical capital. While this may increase the cost of the program relative to STAR, it seems likely that a large scale CSR program would still pass a cost-benefit test.

4. Curricular and Instructional Interventions

The benefits of preschool intervention may be squandered if disadvantaged children go on to spend time in low-quality elementary or high schools. There is a vast literature within education that studies the efficacy of classroom-based interventions, including curricula, pedagogical strategies, professional development approaches and features of school organization that are directly related to teaching and learning. Unfortunately, very few of these programs have been rigorously evaluated, and as a result, there have been many heated debates about the relative effectiveness of these interventions.

In 2002, the Institute for Education Sciences (IES) within the US Department of Education created the What Works Clearinghouse (WWC) in order to collect and disseminate scientific evidence on various educational interventions. A brief review of the WWC website highlights the lack of convincing evidence on curricular interventions. For example, WWC found only one program with strong evidence of improving reading achievement among beginning readers (i.e., Reading Recovery), one program for elementary school math (i.e., Everyday Mathematics) and two programs for middle school math (I Can Learn Algebra/Pre-Algebra and Saxon Middle School Math). Moreover, WWC reviewed and excluded a large number of studies that did not meet a minimal standard of evidence, and even the programs for which there is strong evidence of success according to WWC show a disappointingly low level of rigorous research. For example, the Everyday Mathematics curriculum was introduced in 1983 and has since been used in 175,000 classrooms by approximately 2.8 million students (WWC 2007). Yet, WWC only found four studies of Everyday Mathematics that met minimal standards of evidence, and these all fell into the less rigorous category of "meets evidence standards with reservations." There is equally little evidence that educational software programs have significant impacts on student learning despite the growing popularity of such programs (Dynarski et al. 2007).

A particularly interesting and conceptually appealing subset of interventions is commonly referred to as Comprehensive or Whole School Reform models (WSR). As their name suggests, these programs simultaneously attempt to improve a variety of different aspects of the school at the same time, hopefully in a fashion that makes the changes complementary and reinforcing. For example, a WSR model may combine curriculum materials, professional development, teacher mentoring, reorganization of the school day (e.g., block scheduling) and school structure (e.g., schools-within-a-school). Examples of commonly known WSR models include Success for All (Borman and Hewes 2003), Comer Schools (Cook et al. 2000), Direct Instruction (CRSQ 2006), Accelerated Schools (Bloom et al. 2001), America's Choice (CRSQ 2006), Career Academies (Kemple and Scott-Clayton 2004), Project GRAD (Snipes et al 2006), First Things First (Quint et al 2005) and Talent Development (Kemple et al 2005).

At the elementary level, there is evidence to suggest that a few models may improve student outcomes. Perhaps the most promising intervention is Success for All (SFA).[10] SFA is a comprehensive whole-school reform model that operates in more than 1,200 mostly high-poverty schools. SFA focuses on reading, with a particular emphasis on prevention of reading difficulties and early intervention for struggling readers. Consistent with this emphasis, children receive 90 minutes each day of reading instruction in groups that are organized across grade levels based on each child's current reading level, which helps teachers to target instruction. Students engage in cooperative learning exercises in which they discuss stories or learn from each other, which helps reinforce what teachers do and build social skills. Children are assessed at eight-week intervals, using both formal measures of reading competency and teacher observations. Children who are

[10] Several other elementary school models have shown some promise, including Comer Schools (Cook et al. 1999, 2000) and Direct Instruction (CRSQ 2006).

falling behind are given extra tutoring or other help with whatever might be impeding success (such as health or behavior problems). The program utilizes regular classroom teachers who receive brief initial training, ongoing coaching, and other forms of support and professional development.

A recent random assignment evaluation of SFA provides compelling evidence of the program's effectiveness (see Borman et al., 2007). At the end of three years, students in the treatment schools scored roughly 0.2 standard deviations higher than students in the control schools on a standardized reading assessment. These effects were statistically significant and substantial in magnitude (i.e., 0.2 standard deviations is equivalent to about one-fifth the gap between low and high socioeconomic-status children).

SFA costs about $950 per student per year (Borman and Hewes 2003), with about two-thirds of this cost associated with the program's tutoring component. Current spending under the federal government's Title I program is around $880 per eligible student, and that there is to date very little evidence that this Title I funding as typically deployed by public schools translates into any gains in student learning (Gordon, 2004, van der Klaauw, 2008). One implication is that in schools that serve predominantly poor students, SFA could be implemented by just redeploying existing Title I funds. If the experimental evaluation of SFA is correct and the program's impact is anything like 0.2 standard deviations, this type of funding shift would easily pass a benefit-cost test, since Krueger (2003) shows that test score increases of this magnitude would increase the present value of each student's lifetime earnings profile by thousands of dollars.

At the high school level, a number of popular WSR models incorporate similar features. Perhaps the most common feature of high school WSR models involves a reorganization of the larger high school into smaller learning communities, which are referred to under a number of different names including "small schools," "schools within a school," and "learning academies." The goal of small learning communities is to provide a more personalized learning environment that will serve to engage and motivate students, and prevent at-risk students from "falling through the cracks." Other common reform features include work-based learning opportunities (e.g., internships) and concerted assistance for students who enter high school with poor academic skills (Herlihy and Quint 2006).

While these models are promising in many respects, there is little rigorous evidence that, as currently implemented, these approaches improve student outcomes. The most rigorous evaluation of a high school WSR is the random assignment study of Career Academies that was initiated in 1993 and is continuing to this day. Career academies are generally organized as small learning communities of between 150 and 200 high school students (often housed within larger, comprehensive high schools) that focus on a specific occupation or industry. Unlike the vocational education programs that were popular in the 1970s and 1980s, career academies attempt to combine academic and technical curriculum, often using the technical curricula relevant to a particular industry in order to motivate students. One hallmark of these programs is to establish a connection with employers in the given field, which occurs through mentors and internships of students with local employers.

Early results of the Career Academy evaluation indicated that students in the program group reported that their school provided a more personalized learning environment relative to students in the control group. The program had positive impacts on attendance and completion of course credits in the early years of high school. A later follow-up found no differences in the high school completion rates between program and control groups, but did find a substantial impact on earnings among high-risk students. While these initial results are encouraging, more work is needed to assess the potential of this approach (e.g., whether the positive effects documented in the prior research would generalize to students who do not volunteer for the program, and whether the career academies studied as part of this evaluation are of higher quality than the typical career academy).

5. Teacher Labor Markets

Specific curricular interventions, comprehensive school reform strategies and class size reductions aim to enhance the ability of existing teachers of poor students. An alternative approach is to change the mix of teachers working in schools serving disadvantaged students, or to change the compensation offered to existing teachers. Casual observation as well as a growing body of empirical research suggests that teachers vary tremendously in their ability to foster student learning. If we could give disadvantaged children access to the most effective teachers, that may make a substantial difference in narrowing disparities in schooling outcomes. In this section, we review the research relating to teacher labor markets and discuss several policies relating to teacher hiring, promotion and compensation which might be able to improve the distribution of teachers across schools.[11]

A growing body of research has identified substantial variation across teachers in the ability to raise student achievement. These studies estimate teacher effectiveness by comparing changes in student achievement scores across classrooms, controlling for student, classroom and school characteristics that would be expected to influence student achievement regardless of the teacher. In this way, these studies attempt to isolate the value that an individual teacher adds to student achievement, and are thus commonly referred to as "teacher value-added" studies. These value-added studies find that there is substantial variation in teacher effectiveness, both within and across schools. According to a recent analysis of NYC elementary school math teachers, for example, students whose teacher falls in the top quarter of effectiveness learn roughly 0.33 test

[11] The discussion in this section draws heavily on Jacob (2007). Professional development, including mentoring for novice teachers, is another strategy for enhancing teacher ability. Such policies should be considered complements to the policies we outline in this section. For an excellent review of evidence on professional development, see Hill (2007).

score standard deviations more in a single year than students whose teachers are in the bottom quarter (Kane et al. 2006).[12]

Value-added measures of teacher effectiveness do not seem to be highly correlated with very many of the easiest-to-observe characteristics of teachers. On the one hand, there is good evidence that novice teachers are less effective than more experienced teachers, but this experience premium seems to disappear after the first few years of teaching (Rockoff 2004). There is also some evidence that teachers who are, for lack of a better term, smarter (as measured by the SAT or various teaching exams) are more effective than others (but see Harris and Sass 2007 and Clotfelter et al. 2007 for conflicting evidence on this topic). On the other hand, researchers have found little, if any, differences in the achievement gains of students assigned to traditionally certified, alternatively certified or uncertified teachers (see, for example, Kane et al. 2006 and Boyd et al. 2005 for evidence on New York City). Similarly, researchers have found teachers who have advanced degrees are not more effective than other teachers.

Hence, the policy challenge in the domain of teacher labor markets is to induce more highly effective teachers to teach in schools serving the most disadvantaged children, knowing that effectiveness cannot easily be measured by common markers such as the certification status or educational background of the teacher. One popular approach that shows promise is to promote alternative paths into teaching.

Traditional certification requirements impose a high cost (both in terms of money and time) on individuals interested in teaching, and they have been shown to dissuade many highly skilled individuals from entering the teaching profession. Dozens of studies have explored the relative effectiveness of teachers with traditional versus alternative (or no) certification. The emerging consensus is that differences between the groups are relatively small, and that in certain grades and subjects there is even evidence that teachers with alternative certification outperform those with traditional certification (Boyd et al. 2005; Kane, Rockoff and Staiger 2006, Glazerman et al. 2006). Hence, the creation of alternative certification may help to improve the supply of teachers without reducing quality.

Another strategy is to entice teachers to work in hard-to-staff schools and/or subjects through financial incentives – namely, targeted salary increases or bonuses. Many studies have documented that wages play an important role in the initial decision to teach, the decision to remain in teaching and the decision of where to teach (Dolton & van der Klaauw, 1999; Hanushek,

[12] Other recent value-added studies include Harris and Sass (2007), Hanushek et al. (2005), Aaronson et al. (2007), and Boyd et al. (2006). It is worth noting two concerns with such value-added measures of effectiveness. One involves the statistical precision or reliability of the measures; the other involves the possible biases inherent in such measures. First, given the relatively small number of students that an individual teacher works with in any given year (i.e., as few as 15 or 20 for many elementary school teachers) and the imperfect reliability of student achievement tests, teacher "value-added" measures are generally, in practice, measured with considerable error (Kane and Staiger, 2002a,b). That is, the "confidence interval" around an estimate of a teacher's effectiveness is often quite large. influence the rate of growth in children's test scores not just their levels. So value-added measures may partly confound the causal contribution of the teacher to student learning with those of the characteristics of the children in the classroom (Rothstein 2007).

Kain, & Rivkin, 2004; Loeb and Page 2000; Scafidi, Stinebrickner, & Sjoquist, 2007; Stinebrickner, 2001, 2002; Boyd, Lankford, Loeb, & Wyckoff, 2005). While many states have adopted some sort of financial assistance (e.g., loan forgiveness programs, mortgage assistance, salary supplements), there has been very little systematic evaluation of these programs (Imazeki 2007, Gaurino et al. 2006, Glazerman et al. 2006). Recent evaluations of targeted bonuses in North Carolina and California provide some evidence that such measures can induce teachers to work in high-need schools (Steele et al. 2008 and Clotfelter, Ladd and Vigdor 2006), but more rigorous evaluation is certainly needed.[13] Key questions include whether such programs will be able to induce teachers who would not otherwise have taught, and how long such teachers will remain. Moreover, financial incentives that are not tied to teacher performance run the risk of inducing ineffective teachers to locate in hard-to-staff schools.

Policies focusing on teacher hiring, promotion, and dismissal may also be important levers for improving the quality of public schools.[14] Given the wide variation in effectiveness, policies that help school officials identify and hire the best applicants could have an important impact on student outcomes. Unfortunately, there is little guidance that researchers can provide in this area. On the other hand, there is ample evidence that certain political and bureaucratic aspects of the teacher hiring process drives many qualified applicants out of high-poverty, urban districts. For example, researchers at the New Teacher Project have documented that staffing rules, late state budgets and inefficient human resource procedures dissuade many qualified applicants from teaching in urban schools (Levin and Quinn 2003, Levin et al. 2005). This research suggests that changes to collective bargaining agreements that reform staffing rules and a more efficient, customer-focused approach to HR would improve the teacher quality in high-poverty schools.

Whatever system is used to hire teachers, it is inevitable that some teachers will not perform well in the classroom. Recognizing that the hiring process is imperfect, virtually all school systems today place new teachers on probation for several years, subjecting them to an up-or-out tenure review. However, in practice, public schools do not seem to take advantage of the probationary period to obtain additional information about teacher effectiveness and weed out lower-quality teachers.[15] In New York City, for example, only about 50 out of roughly 75,000 teachers were dismissed for performance-related reasons in recent years.[16] In the Chicago Public Schools, only 15

[13] Mathematica Policy Research is in the process of conducting a study of targeted financial incentives, which should shed additional light on this type of policy option.

[14] Interestingly, there has been remarkably little research on these teacher "demand" policies. One reason is the common perception that disadvantaged school districts are in a state of perpetual shortage, and thus hire any warm body that walks through the door. In reality, this is not the case. While there are often shortages in certain subjects and grade levels, many of the most disadvantaged districts in the country have an ample supply of teachers for most positions. For example, the Chicago Public Schools regularly receives 10 applications for each position. In 2005, an alternative certification program, Teaching Fellows, received over 17,500 applications for 2,000 spots in New York City. (Personal communication with Andy Sokatch of the New Teacher Project.)

[15] As mentioned earlier, professional development is clearly an important complement to the dismissal of underperforming probationary teachers.

[16] Personal communication with Jonah Rockoff, February 19, 2008.

out of 11,621 teachers who were evaluated in 2007 received a rating of unsatisfactory, and only 641 out of 11,621 (roughly 5.5 percent) received a rating of satisfactory. The remaining teachers were rated excellent or superior.[17]

One possible fix to this problem is to raise the tenure bar for new teachers, and to deny tenure to those teachers who are not effective at raising student achievement. Some have suggested that this type of evaluation should be based at least in part on teacher value-added scores (e.g., Gordon et al. 2006). We concur with the general recommendation to institute more rigorous and meaningful tenure reviews, but would suggest that this type of high-stakes decision should be based on a variety of teacher performance measures including, but not limited to, measures of effectiveness at raising student test scores. Given the concerns about the reliability and validity of value-added measures discussed earlier, these indicators should not be the only criteria used in making high-stakes decisions such as teacher dismissal.

While commonly measured teacher characteristics have little correlation with student achievement, there is some evidence that principals recognize which teachers are most effective in their schools. Jacob and Lefgren (2007) compare principal ratings of teacher effectiveness with "objective" measures of teacher effectiveness calculated using student achievement gains. They find that principals can identify the best and worst teachers in their schools but have no ability to distinguish between teachers in the middle of the ability distribution. This research suggests that principal evaluations should be included as one factor in teacher tenure ratings, both because they may add some additional information beyond student test scores but also because they will mitigate potential negative effects of relying solely on an output-based measure (e.g., teachers cheating or teaching narrowly to the test in order to maximize short-run student test scores at the cost of skills that will maximize long-term learning).

One might still be concerned, however, that principals would be hesitant to deny tenure to many teachers. Several years ago, the Chicago Public Schools and Chicago Teachers' Union signed a new collective bargaining agreement, which among other things gave principals considerable latitude to dismiss untenured teachers. Jacob (2008) examines the choices that principals made to dismiss or not dismiss their probationary teachers, and examines the impact of the policy change on teacher productivity. He finds that the teachers who were selected for dismissal did have more absences and lower value-added scores than other probationary teachers in the same school who were not selected for dismissal, suggesting that principals did consider productivity in making their decisions. At the same time, however, Jacob (2008) reports that 30-40 percent of principals – including many at very low-performing schools – did not dismiss any teachers. This finding suggests that some public school administrators may be reluctant to remove poor performing employees. One reason may be that it is difficult to hire high-quality replacements, and so principals might be reluctant to risk the chance of getting an even worse replacement. It is also possible that principals are simply reluctant to incur the social and political costs associated with

[17] Calculation by Brian Jacob.

dismissal. In either case, it suggests that policies to raise the tenure bar must incorporate some system to ensure that these tough decisions are made.

Teacher compensation often arises in discussions of school reform. Currently, public school teachers are paid according to strict formulas that incorporate years of service and credits of continuing education including Master's and doctorate degrees, despite the fact that research consistently finds that advanced degrees are not associated with better student performance and experience only matters in the first few years of teaching. For this reason, reformers have suggested that a teacher's compensation should be tied directly to her productivity as measured by student performance or supervisor evaluation. Proponents of such "pay-for-performance," also known as "merit" or "incentive" pay, argue that it would not only provide incentives for current teachers to work "harder" or "smarter," but also could alter the type of individuals who enter the teaching force and then choose to remain.

Critics of merit pay raise a number of concerns with this approach. They argue that teaching is a collaborative venture and that incentive pay for individuals could harm the teamwork necessary for effective schools. They note that it is difficult to monitor teachers and that because there are multiple objectives, a system that focuses on one easily observable outcome such as student test scores will likely distort teacher behavior. For example, teachers may focus their attention on the subjects that "count" under the performance system, or they may neglect students who they view as too far behind or even too far ahead. For their part, proponents counter that pay-for-performance systems can focus on teams of teachers or schools, and that one might incorporate principal evaluations as well as test scores in order to mitigate distortions.

As Murnane and Cohen (1986) note, incentive pay has a long history in American education, though few systems that directly reward teachers on the basis of student performance have survived. While many teachers today indicate that their compensation incorporates some aspect of incentive pay, there are very few examples of pay that is tied closely with student performance. One prominent example is the Teacher Advancement Program (TAP), which incorporates some aspects of incentive pay along with pay for additional professional development activities and other service. Similar programs have recently been enacted in Denver, Colorado and Minnesota. These programs are considerably more popular than many "old style" merit pay programs, and there is some tentative evidence that they may improve student performance on standardized tests (see, for example, Springer et al. 2008). Given this tentative but positive evidence, we believe that it is worthwhile for schools and districts to continue experimenting with, and evaluating, pay for performance.[18]

[18] The most rigorous evaluations of teacher incentive pay have taken place outside the United States, in Israel, India and Kenya. For a review of this international evidence, see Lavy (2007) and Podgursky and Springer (2008).

6. Education Accountability

Class size reduction is an example of an "input-based" educational intervention, which is based on the assumption that schools will perform better with additional resources. Comprehensive school reform is based in large part on the assumption that schools are not utilizing optimal pedagogical practices, and therefore seek to improve schooling outcomes with a prescriptive approach that lays out a new and hopefully more effective set of teaching strategies. A different approach is to instead provide teachers with incentives to identify more effective pedagogical strategies on their own, or motivate them to implement whatever strategies they are using more effectively.

This bottom-up approach is at the heart of education accountability reform, which allows for some heterogeneity in what constitutes best practice across schools, classrooms and individual children. A growing body of empirical research suggests that accountability reforms can foster positive changes in behavior by school administrators, teachers, and students. At the same time, this research also documents that incentive-based reform strategies often generate unintended negative consequences, such as teachers neglecting certain students, cutting corners or even cheating to artificially raise student test scores. The fact that actors within the school system do indeed seem to respond to changes in incentives highlights both the promise and potential pitfalls of accountability reform, and underscores the importance of the specific design details of accountability policies.

> While studies of school-based accountability policies in the eighties and nineties found mixed results[19], two major accountability reforms from the late 1990s – in Chicago and Florida – have been particularly well studied. Jacob (2005) examines the impact of an accountability policy implemented in the Chicago Public Schools (CPS) in 1996-97. In 1996 the CPS introduced a comprehensive accountability policy designed to raise academic achievement. The first component of the policy focused on holding students accountable for learning, by ending a practice commonly known as "social promotion" whereby students are advanced to the next grade regardless of ability or achievement level. In conjunction with the social promotion policy, the CPS also instituted a policy that placed low-performing schools on probation, which entailed a modest amount of additional resources along with enhanced monitoring and the threat of future closure.

Using a panel of student-level, administrative data, Jacob (2005) finds that math and reading achievement increased sharply following the introduction of the accountability policy, in comparison to both prior achievement trends in the district and to changes experienced by other large, urban districts in the mid-west. However, for younger students, the policy did not increase performance on a state-administered, low-stakes exam. An item-level analysis suggests that the observed achievement gains were driven by increases in test-specific skills and student effort. This

[19] See Jacob 2005 for a review of this literature.

finding is consistent with prior work suggesting that test preparation associated with high-stakes testing may artificially inflate achievement, producing gains that are not generalizable to other exams (Linn and Graue et al. 1990, Shepard 1990, Koretz et al. 1991, Koretz and Barron 1998, Stecher et al. 1999, Klein et. al. 2000). Nonetheless, it is worth noting that the policy did lead to substantial achievement gains for older students and that the test-specific gains likely represent real learning of the skills found on the high-stakes exam. Moreover, the policy appears to have been most effective for low-achieving students in low-achieving schools, the vast majority of whom are quite poor.

A number of researchers have examined the school-based accountability plan implemented in Florida several years prior to the introduction of NCLB. Figlio and Rouse (2006) study Florida's A+ Plan for Education, a school-based accountability system that was implemented several years before the introduction of NCLB. In 1999, schools received "grades" based on their students' test scores on the Florida Comprehensive Achievement Test (FCAT). Under the A+ Plan, schools that received a failing grade (i.e., "F") in two consecutive years were required to offer their students vouchers to enroll in private schools. Schools that faced declining enrollments were subject to staff cuts, and additional sanctions. It was hoped that the stigma associated with the highly visible failing grade, coupled with the threat of competition induced by the vouchers, would provide low-performing schools an incentive to improve.

Figlio and Rouse (2006) find that the designation of a school as failing led to a significant increase in student math performance, on the order of 5 scale score points, which is roughly 0.1 standard deviations. The impact of receiving an "F" on a low-stakes math test is about half as large. Researchers studying later versions of Florida's accountability system find similar effects (Chiang 2007, Rouse et al. 2007). Moreover, they find evidence that much of these learning gains were sustained in the following few years.

While these studies suggest accountability policies can improve student achievement, there is also a substantial body of evidence that educators respond strategically to test-based accountability in a variety of unintended ways, some of which may have negative consequences for students. Jacob (2005) finds that educators in Chicago responded to the accountability program by placing a larger fraction of low-performing students in special education (and thus removing them from the test-taking pool[20]), retaining a larger fraction of students before they reached the grades where they were subject to accountability mandates (i.e., in kindergarten through second grade), and by shifting attention away from subjects such as science and social studies that were not used to determine student or school sanctions under the accountability policy. Each of these responses had the effect of increasing a school's performance under the accountability policy, and thus one may be inclined to view such behavioral responses as inappropriate and detrimental to student learning. However, it is also possible that some, and perhaps most, educators viewed these steps

[20] Unlike more recent accountability reforms, the program in Chicago did not explicitly monitor the faction of students who were tested so that placing students in special education would benefit a school rating.

as appropriate responses, which would benefit students.[21] Other studies have found similar results for strategic responses to accountability reforms by school personnel.[22] A growing body of research also suggests that accountability systems generate larger improvements among students who are relatively closer to the passing threshold used to reward schools.[23] Finally, Jacob and Levitt (2003) find that the prevalence of teacher cheating rose sharply in low-achieving classrooms following the introduction of the accountability policy in Chicago.

The vast majority of studies on school-based accountability have focused on a particular district or state. However, two recent studies utilize data from the National Assessment of Educational Progress (NAEP) to assess the impact of standards-based accountability across a variety of states. These studies are useful not only because they provide something of a "national assessment" of accountability, but also because the NAEP data they utilize as an outcome measure was not used by any state as part of its accountability program, which means educators in the state had no incentive to manipulate test scores in the way that prior studies document has occurred for high-stakes exams. Both studies find positive achievement effects overall, although they do not find evidence that accountability policies have consistently reduced the racial achievement gap (Carnoy and Loeb 2003 and Hanushek and Raymond 2005).

A casual review of recent NAEP data suggests that NCLB may have improved student achievement, particularly the math performance of younger children. However, to our knowledge, there has not been any systematic investigation of the impact of NCLB at a national level, which attempts to account for prior achievement trends or other the presence of other policies.

[21] A struggling student may benefit from placement special education services. Similarly, teachers and administrators often believe that holding children back in an earlier grade provides them additional opportunities to mature and to master basic skills before moving on to more advanced grades. And with regard to the subject emphasis, the focus on math and reading relative to science and social studies was arguably one of the intended goals of the program.

[22] Koretz and Barron (1998) find survey evidence that elementary teachers in Kentucky shifted the amount of time devoted to math and science across grades to correspond with the subjects tested in each grade. Deere and Strayer (2001) found evidence that Texas schools have substituted across outputs in the face of the Texas Assessment of Academic Skills (TAAS) system, focusing on high-stakes subjects and low-achieving students. Grissmer and Flanagan (1998) make a similar point regarding National Assessment of Educational Progress (NAEP) gains. Figlio and Getzler (2002) and Cullen and Reback (2002) find that schools respond to accountability policies by classifying more students as special needs or limited English proficient (LEP), thereby removing them from the test-taking pool. Figlio (2006) finds tentative evidence that, in response to accountability pressures, schools attempt to reshape the testing pool through selective discipline, which leads low-performing students to miss testing. Figlio and Winicki (2006) find that Virginia school districts with schools facing sanctions under the state's accountability program increase the caloric content of school lunches served on testing days, while school districts without schools facing immediate sanctions do not alter their menus during the same period. The authors argue that given the established relationship between nutrition and short-term cognitive functioning, it is likely that manipulation of the school menus was intentional on the part of school in order to maximize student performance.

[23] Examining Florida's A+ plan, Chakrabarty (2006) finds that failing schools focused more on students below the minimum criteria cutoff. Neal and Schanzenbach (2007) provide evidence that accountability systems that judge schools on the basis of the fraction of students who meet proficiency goals, which the authors refer to as proficiency-count systems, generate larger improvements among students in the middle of the ability distribution (rather than benefiting the very lowest-achieving students).

7. School Choice

Another popular systemic, process-oriented approach to school reform is to provide parents greater choice of the schools for their children either through public magnet schools, charter schools, or vouchers for students to attend private schools.[24] There are two ways in which choice might serve to improve student achievement. First, choice proponents suggest that by creating a marketplace where parents can select schools, a choice-based system might generate competition among schools that would improve the quality of schools throughout the marketplace. This theory rests on several assumptions. To begin, the degree of choice must be sufficiently large to generate meaningful competition. For example, a handful of charter schools with limited enrollment capacity are unlikely to generate meaningful competition in a large district. This suggests that a choice system must permit relatively easy entry into the market by potential suppliers, which includes individuals and organizations wishing to open schools. On the flipside, there must be easy "exit" from the market – that is, unsuccessful schools must be allowed to close. If the administrators and teachers in a public school that loses half of its students to a nearby charter school continue teaching the smaller group of students, or are merely reassigned to other schools in the district, they may not be inclined to change their practices despite the pressure exerted by the nearby charter.

The second set of assumptions involves the information available to parents and the preferences they have for their children's education. Parents must have sufficient information to make an informed choice. Data on school performance must be transparent, accessible and easily understood by parents with varying degrees of sophistication. The effects of choice will also depend in large part on the nature of the preferences themselves. Expanded choice is only likely to increase student academic outcomes if achievement is a central concern for parents. If, instead, parents choose schools on the basis of, say, the availability of extracurricular activities, then choice may have little influence on outcomes such as math and reading scores.

Even if school choice does not foster competition that increases the productivity of schooling overall, the opportunity to choose may still have a positive effect on an individual student. Choice might allow a student an opportunity to attend a school with better teachers, more resources or more studious peers. In the absence of any other policies to improve the supply of good schools however, improvements realized through this mechanism may simply permit one child to benefit from a higher quality schooling experience while denying another child this opportunity. Of course, if the goal is to reduce inequity in schooling opportunities and outcomes, and school choice

[24] Magnet schools are distinguished from traditional public schools in that they do not draw students from a pre-defined neighborhood. Rather, students from throughout a district may be eligible to attend a magnet school. Charters school are similar to magnet schools in that they need not draw only students from a particular geographic area. However, they are distinct from traditional and magnet public schools in that they generally have more autonomy with regard to curriculum, instruction, staffing and other school policies. However, they are distinct from traditional and magnet public schools in that they generally have more autonomy with regard to curriculum, instruction, staffing and other school policies. However, charter schools are similar to public schools in that they are publicly-funded and generally free to students, in contrast to private schools which charge tuition.

provides choices to disadvantaged students who would not have them otherwise, then the choice may still have served a worthwhile purpose. Some argue that choice provides poor parents the opportunities that wealthier parents have always had.

The availability of choice may also improve student outcomes if it allows parents to find schools that are a better "match" for their individual child's needs. The back-to-basics, discipline-oriented "academy" may be a good fit for some students, while other children may thrive more in an environment that provides more flexibility and autonomy. The match may reflect more mundane needs as well, including proximity to the parents' work or the availability of a particular elective. The improvements in "match quality" that choice produces can, in theory, allow many or all students to benefit from choice. Some would argue that if choice allows parents to select the type of schools they want, the system should be considered a success. While this may be true from the parents' perspective, if society (i.e., taxpayers) value certain outcomes more than others (e.g., society places positive value on academic achievement and negative value on re-segregation along racial or socioeconomic lines), then free choice on the part of parents may not maximize social welfare.

The last decade has seen a blossoming of research on school choice. A central problem that all school choice research must address is the fact that students who utilize school choice (whether it is a public magnet school, a charter school or a private school) are different from those who do not. These students often differ in terms of easily observable factors such as race, income and achievement level but, more importantly, they are almost certainly different in more subtle ways such as personal motivation or family support. If researchers do not account for such differences when comparing, for example, charter schools with neighborhood public schools, then they can the results can be quite misleading. In the remainder of this section, we briefly summarize the state of the literature in a few key areas with regard to school choice.

In order to understand the potential impacts of choice, a number of researchers have attempted to assess parental preferences with regard to their children's schooling. Recognizing that parent self-reports as captured in most survey data are subject to a number of potential biases, several studies use data on the actual choices that parents make to infer what school characteristics parents value the most (Glazerman 2000, Calvo 2006, Hastings et al. 2006). These studies find that parents place a high value on proximity (i.e., attending a school close to their home) and student racial composition (i.e., white parents in particular do not want their children to attend schools with a large number of non-white children). Researchers find, on average, that parents place limited value on the "academic quality" of the school as measured by student test scores or other standard indicators, though parents with higher income tend to place a higher priority on the school's test scores (Hastings et al. 2006).

However, recent work suggests that better information can influence parent choices. In an innovative field experiment, Hastings et al. (2007) demonstrate that a random sample of parents provided with more transparent information about the school-level performance of choice schools in the Charlotte-Mecklenburg Public Schools are more likely to choose higher-performing schools

relative to a control group. This suggests that policies designed to assist lower-income parents in their decision-making might shift their behavior such that their children benefit from the most academically effective schools.

In addition to studying parent preferences within the context of public school choice plans, researchers have also examined the impact of attending a public school of choice on student achievement. In order to obviate the issues of selection bias described above, several studies have focused on popular choice schools, which are oversubscribed and use lotteries to determine admission. By comparing the outcomes of students who win and lose school lotteries, the researchers can estimate the causal impact of attending a public school of choice. The evidence here is mixed. Looking at elementary and high schools in Chicago, Cullen et al. (2006, forthcoming) find that winning a choice lottery has no effect on a wide range of academic outcomes.[25] In a study of school choice lotteries in the Charlotte-Mecklenberg school district, Hastings et al. (2006a) find that, on average, students do not benefit from winning one of the lotteries and attending their preferred school. However, when they examine children whose parents seemed to place a greater value on academics (based on the type of schools they chose), the authors find that these students do experience higher test scores from winning the public school choice lottery. Finally, there is some evidence that career academies, one prominent type of public choice school, have positive effects on student outcomes (Cullen et al. 2005, Kemple and Scott-Clayton 2004).

A parallel literature analyzes the effect of attending a charter school on academic outcomes, and yields similarly mixed outcomes. Several studies based on state administrative databases find small negative or zero effects (see, for example, Hanushek et al. 2005, Bifulco and Ladd 2006, Sass 2006). A recent random evaluation of NYC charters uses a lottery-based research design like those described above, comparing students who win and lose lotteries to oversubscribed charter schools, and finds robust positive effects (Hoxby and Murarka 2007). This approach removes all concerns about selection bias, but has the drawback of focusing on a relatively small number of particularly successful (or at least particularly popular) charter schools.

Perhaps the most contentious form of school choice involves vouchers that allow students to attend private schools. Several local voucher experiments in Milwaukee, New York, Dayton and Washington, DC have been evaluated. Like the public school choice literature, these studies typically focus on comparing outcomes between students who are versus are not offered the chance to attend private schools. While the results in most cities were discouraging, the evaluation in NYC pointed to some modest test score gains for African-American children, although the magnitude and robustness of these results has been debated (Howell et al. 2002, Krueger and Zei 2004).

[25] For high school students, the authors find some evidence that winning a choice lottery improves certain non-academic outcomes such as the likelihood of getting into trouble with the police.

Perhaps the most difficult area of school choice to analyze empirically is the claim that choice will foster competition that will, in turn, improve the productivity of all schools. Consider, for example, the private school voucher experiments described above: none were remotely large enough to provide serious competition for the surrounding public schools. A seminal study by the economist Caroline Hoxby compared geographic areas, and found that those areas with more school choice for largely historical reasons (e.g. the presence of streams and rivers which made transportation difficult in earlier times, and thus encouraged areas to divide themselves along the boundary of such waterways), had more productive schools, suggesting that greater choice is associated with greater efficiency in schooling (Hoxby 2000). While Hoxby's analysis is extremely clever, it has been criticized on technical grounds by others who claim that the results are not robust (Rothstein 2006, Hoxby 2006). Hsieh and Urquiola (2006) present evidence from Chile's large-scale school voucher program suggesting that vouchers did not have large system-wide impacts on student learning in Chile, but did lead to increased sorting as the "best" public school students left for the private sector. In work using US data, Urquiola (2005) finds additional evidence of sorting. Specifically, he finds that areas with greater district choice tend to have a smaller fraction of students attending private schools, but these districts also have schools that are more racially homogenous.

In summary, there is mixed evidence on whether the opportunity to attend a choice school – public magnet, charter or private – has substantial academic benefits for poor children as well as on the question of whether large scale choice programs might improve the productivity of schools in a general. Hence, in our view, it is premature to make any strong claims about whether such policy proposals will have important consequences for the schooling outcomes of disadvantaged or other children. On the other hand, we believe that the charter and magnet schools may offer some benefits with little risk of negative consequences, and thus would encourage states and districts to continue allowing and even fostering these alternative schools with little downside risk.

8. Conclusions

The release of the Coleman Report in 1966 fostered pessimism about the ability of schools to improve the life chances of poor children. The report found that observable school "inputs" such as teacher educational attainment were only weakly correlated with student test scores. Coleman's argument seemed to be underscored in the minds of many by the dramatic increase in per pupil educational expenditures that has occurred over the past several decades, which have not obviously been reflected in either improvement in achievement test scores or in America's level of achievement relative to other countries. These findings contributed to a new focus on "output" based education reforms that sought to improve school performance without substantial new expenditures, by changing the incentives and behaviors of actors within the public school system.

The quality of the empirical evidence on the effectiveness of different input- and output-based policies has improved dramatically over the past few decades due to dramatic improvements in

longitudinal data systems, computing power and micro-econometric methods, which together have allowed researchers to more carefully examine a variety of interventions. At the same time, results from a number of important random assignment studies of model programs have become available. Our reading of the available evidence suggests that there are a number of promising interventions of both the input and output variety. If we care about improving the lives of poor children, the relevant questions to ask next then must be: To what degree are promising educational policies being enacted? To the degree to which the most promising interventions are not being implemented on a sufficient scale, why not, and what can be done?

The most significant changes in education policy in recent years have come in the form of new output-based reforms, the most noteworthy being the federal No Child Left Behind (NCLB) act, signed into law by President George W. Bush. NCLB was enacted with bipartisan support, although it has received considerable criticism in the past few years and there is even talk in some circles of abolishing NCLB altogether. In our view, the debate over the existence of NCLB misses fundamental lessons that have been learned in the past decade of accountability reforms: design features matter enormously. It would be a shame if the current concerns with how NCLB has been implemented leads to a large-scale retreat from outcome-oriented accountability in education. Instead, we would encourage legislators to consider the following three changes to NCLB.

First, we encourage the adoption of a single achievement standard for all districts in the country. The provision that allowed states to choose the tests they use for measuring student performance has resulted in vast disparities in academic rigor across states. Knowing the political difficulty in imposing a uniform national standard, we support the recent efforts by national associations of state officials and educators to voluntarily adopt common standards. Second, we recommend moving away from a single proficiency level, which leads schools to neglect students who are far above or below this threshold. Instead, schools should be held accountability for the *gains* that all students make each year. Finally, we suggest that if the current level of federal funding is not increased substantially, states and districts be provided the flexibility to focus on the schools most in need of improvement.

The other noteworthy trend in output-based reform is the spread of public school choice at the local level, particularly in our cities. While we believe that the current evidence on the benefits of public school choice is limited, we also feel that the risk associated with these policies is small. Hence, we encourage states to develop policies to facilitate the expansion of magnet and charter schools that have considerable autonomy.

Research on output-based policies suggests it is possible to improve outcomes from the current school system without new spending. But there are limits to these efficiency gains. Given the size of the disparities in schooling outcomes between rich and poor children, and between minority and whites, it is encouraging that there also seem to be a number of promising investments that could be made in this area. While several of these investments seem likely to pass a benefit-cost test, in light of current budget realities it seems important to also think about how to prioritize where new educational spending should go.

If the goal is to improve the life chances of poor children, in our view the priority for new spending in this area should be for early childhood education programs. Even though short-term gains in IQ or academic achievement test scores attenuate over time, there is still evidence of long-term changes in school dropout, criminal behavior and other outcomes that are clearly relevant to helping children escape from poverty when they grow up. Importantly, these encouraging results are not limited to very expensive, boutique model programs – similar benefits have been found with the large-scale Head Start program as well. Increased investment in early childhood education seems particularly important given the relatively limited investments our society makes in improving the cognitive development of children before they reach school age. One result is disparities in academic outcomes between minority and white children or between rich and poor children that show up well before they ever enroll in kindergarten. It is good news that a number of states have on their own implemented universal pre-K programs. It would be better still if more states undertook such efforts, and perhaps better still if the federal government helped take a leadership role to help make this happen.

Many of the other anti-poverty strategies outlined in this volume here focus on helping adults who find themselves in poverty. As Susan Mayer (1996) and many others have noted, America has always felt somewhat ambiguous about helping poor adults, reflecting complicated concerns about both morality and moral hazard. A related concern is the larger potential for a tradeoff between poverty reduction and efforts to boost economic growth. But the most promising of the education policies that we describe here are efficient, in the sense that they should generate benefits to society in excess of program costs, and will also specifically contribute to enhancing future productivity in the economy. They also enjoy what would seem to be a quite compelling moral justification as well: Children should not be punished for the circumstances into which they are born, and improved education policies are one of the best ways from preventing that from happening.

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Improving Educational Outcomes for Poor Children

A Response to Brian Jacob and Jens Ludwig

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I have been asked to respond to the paper by Brian Jacob and Jens Ludwig by discussing similar issues in a UK context. I will start by showing some descriptive statistics for the UK and then follow the general structure of the Jacob-Ludwig paper, considering some of the evidence on 'input-orientated approaches', 'efficiency-orientated strategies' and 'output-orientated approaches' in a UK context.[2]

The US and the UK have much in common with regard to education. Both countries have a 'long tail of underachievement', alongside a highly educated 'top end'. A high proportion of the population is neither functionally literate nor numerate. There is a sizeable gap in the educational attainment of children from different socio-economic backgrounds. The latter issue is illustrated in Tables 1 and 2 and in Figure 1 (from Layard, 2008). Tables 1 and 2 show average performance (in national tests) at the end of primary school and secondary school respectively according to the school's ranking in the 'free school meal' distribution (i.e. where the top quarter shows the most advantaged schools and the bottom quarter shows the least advantaged schools). In both cases, there is a strong negative correlation between performance and the extent of disadvantage in the school. This is also very striking in Figure 1, which also highlights the high variability of performance in secondary schools.

As in the US, raising educational achievement has been high on the political agenda and similar strategies have been tried with regard to school-level policies. Unfortunately, the quantity (and often the quality) of evidence for the UK has often been lower than is the case for the US. It is still fairly common for evaluations to have no proper 'comparison group' of schools/pupils and to contain far too few schools for quantitative analysis to be meaningful. If we want better country-specific evidence of what works to improve educational achievement, then more attention needs to be paid to methodological issues and evaluation needs to be considered at the same time as policy design (rather than after the event). However, there are some good research studies that we can draw on and in recent years excellent administrative data has become available that have allowed issues to be addressed in a better way than previously.

Table 1: Primary schools' performance in English, analysed by % of children with free school meals (2006)

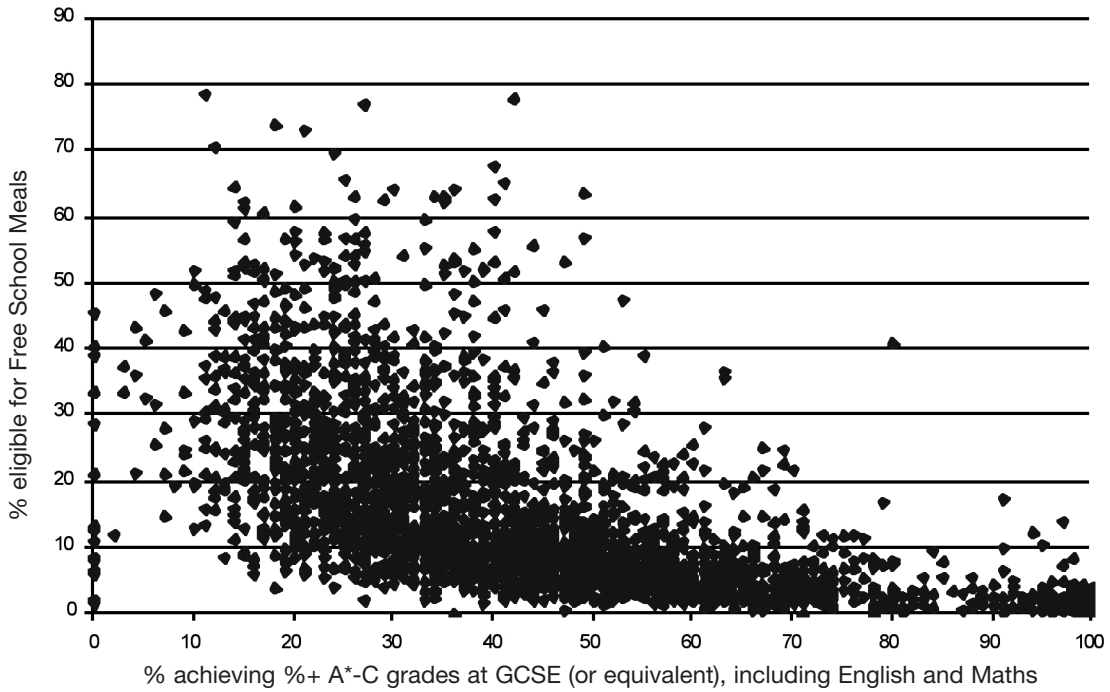
Rank of schools by % on free school meals	Average % of children with free school meals	Average % of 11-year-olds achieving target in English
Top quarter	2	89
Next quarter	7	84
Next quarter	16	77
Bottom quarter	37	69

[2] I will not discuss early years' policy as this will be discussed during another session.

Table 2: Secondary schools' performance in GCSE, analysed by % of children with free school meals (2006).

Rank of schools by % on free school meals	Average % of children with free school meals	Average % of children getting 5 A*-C including English and Maths
Top quarter	3	67
Next quarter	8	47
Next quarter	15	36
Bottom quarter	33	28

Figure 1: The relationship between eligibility to receive Free School Meals and percentage of students achieving 5 or more A-C grades at GCSE (or equivalent), including English and Maths*



Note: All secondary schools in England in 2006 with an entry in the School Performance tables (excluding independent schools and special schools). Source: Data from LEA and School Information System (LEASIS) for free school meals and from Secondary Schools Performance Tables for performance.

Input-orientated Approaches

Under this topic, I will discuss some of the recent UK evidence on class size reduction, educational expenditure and area-based initiatives. Since 1996/97, expenditure on education has increased by 46% (West, 2008) and teachers account for the highest share of school expenditure. The expenditure increase is at least partly reflected in a decrease in average class sizes. About 88 per cent of primary pupils are taught in classes of no more than 30 pupils compared to 72 per cent in 1997. Thus, whether class size reduction and (more generally) the increase in school expenditure have been cost-effective is a very pertinent policy issue in the UK.

The evidence from Project Star has been incredibly influential internationally and there is no experimental evidence for the UK that compares with it. However, a series of papers by Blatchford and co-authors (summarised in Blatchford, 2008) has analysed the 'class size' issue for the UK using a large scale longitudinal study (The Class Size and Pupil Adult Ratio – CSPAR) project. This project tracked over 10,000 pupils in over 300 schools from school entry (age 4/5 years) to the end of primary school (age 11). Blatchford summarises this work as follows: it has been found that there was a clear effect of class size differences on children's academic attainment over the first year (4/5 years), in both literacy and mathematics. The effect size was comparable to that reported by the STAR project. Small classes (below 25) work best in literacy for children with the lowest school entry scores who had most ground to make up. However, the effect of first year small classes only carried over into the second year when children moved into a similar or smaller class.

Holmlund et al. (2008) also find an effect of class size on educational attainment for children at primary school (in this case, attainment is measured at age 11), although their main focus is on the effects of school expenditure. This study is the first (at least in the UK) to make use of several years of pupil-level census data to look at the effects of school expenditure on educational attainment (although Levacic et al. 2005 and Jenkins et al. 2006 conduct similar studies for secondary school based on a single cohort). Using data from recent years (2001/02 – 2005/06) they show that school expenditure has a consistently positive effect on attainment in English, Maths and Science at age 11. The effect sizes in each subject are about 5 per cent of a standard deviation for an increase in expenditure of about £1,000 per annum (i.e. about the actual increase in real per pupil expenditure over the last ten years). This is likely to be of a sufficient magnitude to be cost-effective.[3] The study finds that effects are higher on average for pupils eligible to receive free school meals. With regard to school context (in terms of percentage of pupils eligible to receive free school meals), effects are higher in less advantaged schools for English and in more advantaged schools for mathematics. The authors are still working on this analysis to see how robust results are to the use of different methodologies. Early indications are that effects may be higher in disadvantaged areas (with respect to English, but not mathematics).

[3] These age 11 tests are national tests which are externally set and marked. For those familiar with DSCF points scores, the effect sizes are 0.259, 0.207 and 0.112 in English, Science and Maths respectively or 4.3, 3.5 and 1.9 per cent of a level. A back-of-envelope cost-benefit analysis can be done by relating age 10 scores in the British Cohort Survey (born in 1970) to earnings.

Finally, there have been targeted area-based initiatives to try to raise academic attainment in disadvantaged areas. Excellence in Cities has been a flagship policy aimed at raising standards in inner city secondary schools. This policy was launched in 1999 in over 400 secondary schools in England and is now implemented in about a third of all secondary schools (over 1,000 schools). The funding varied from about £50 in the more advantaged schools to about £140 per pupil in the least advantaged schools. At the outset this funding was allocated to specific strands ('Learning mentors' and 'Learning Support Units' for weaker students; the 'gifted and talented programme' for higher ability students), but became more flexible over time. Machin et al. (2007) evaluate the overall effect of the policy and find it to be effective on average for Mathematics (but not English) and school attendance. Its greatest impact has been in more disadvantaged schools and on the performance of middle and high ability pupils within these schools. A back-of-envelope cost-benefit analysis suggests the policy to be cost-effective. Although this evaluation is positive with regard to the scope of such policies to raise performance in schools that are in disadvantaged areas, it also shows that it is harder (or more expensive) to effect the performance of children who are 'hard to reach' (in the sense that they do not have a sufficiently strong prior level of attainment). However, perhaps this is not so surprising given that the (per pupil) expenditure for this policy has been fairly modest.

Efficiency-orientated Approaches

Reforms to change school organisation, curriculum and teaching practices

As in the US, there is vast literature within education that studies the efficacy of classroom-based interventions but relatively little rigorous evaluation of reforms. I would like to take up the discussion about 'Success for All'. This approach has been applied in a small number of UK schools and some of its features have been applied to the National Literacy Strategy. This includes a fast-paced structured curriculum; direct interactive teaching; systematic phonics in the context of interesting text; and a combination of shared and paired reading and writing (Beard, 2000). All of this has been incorporated into the 'literacy hour', which was introduced for primary schools in England in September 1999. This sets out the content and structure for a daily literacy hour and is a radical departure from what went on before (when teachers had complete autonomy). The fact that the policy was introduced into some schools in a number of Local Authorities before the national roll-out has provided an opportunity to evaluate it because some children were exposed to it at a time when others were not. Machin and McNally (2008a) have found this policy to be extremely cost-effective. It raised achievement in age 11 tests (for reading) by about 8 per cent of a standard deviation at a cost of only £25 per pupil. In more recent (on-going) work, they find that a similar policy for numeracy had a comparable effect; that the effects of both policies persist to age 16 (though only through the effect they have on age 11 tests); that 'years of exposure' matters; and that although the policies worked both in the 'pilots' and for the national strategies, effects

were higher for the former (Machin and McNally, 2008b).[4] The broader message from this analysis is that policy can influence pupils' attainment by imposing some rules on the content and structure of the curriculum. However, what rules to adopt will not be clear in the absence of good research and even then a balance must be struck between raising the minimum threshold of teaching (the implicit aim of the strategies) while not alienating teachers by being overly prescriptive.

Reforms to change structure and/or incentives: labour market for teachers

Most of the good evidence on teacher effectiveness comes from the US, although there have been some major studies in the last 30 years involving observations of teachers in classrooms over 2 years or more, which records aspects of their practice (discussed by Chevalier et al. 2005). The research that exists is based on fairly small numbers of schools. It is worth noting that a little more information in major administrative data sets would radically change the potential of UK research on teacher effectiveness. Specifically, the National Pupil Database contains detailed information on every pupil in the state sector in England. However, we do not know the class they are in for a particular subject (only the year group). The Database of Teacher Records matches all teachers to schools but we do not know the class or year group to which they are assigned.

It is certainly difficult to recruit and retain teachers in the UK. Chevalier and Dolton (2005) document trends in the teacher labour market over time. They note that teacher shortages have been cyclical and regular in occurrence and may partly be attributable to the perceived low wage of teachers relative to other occupations in the public sector. An ageing teaching population (especially in primary education) is expected to create a large shortage of teachers in the next ten years. In addition to problems of recruiting and retaining enough teachers, there is also evidence that current teachers are being drawn from further down the educational achievement or ability distribution than they were in the past (e.g. Chevalier et al. 2007; Nickell and Quintini, 2002).

There is good evidence for the UK that teacher pay and labour market conditions more generally affect teacher supply, as well as some evidence that non-pecuniary conditions matter (see Chevalier and Dolton, 2005). Teacher pay is heavily regulated and there is limited scope for schools to influence teacher salaries (although there is some provision to do this; also there has been a specific scale for London since 2003). Although Performance Related Pay was introduced in 2000, evaluation has not been possible because it was introduced nationally. Furthermore, most eligible teachers received it and thus its relationship with relative performance must be fairly weak.

There is some recent evidence about competition between the state and independent sector over school teachers. Green et al. (2008) find that independent schools are employing a disproportionate share of teachers in Britain relative to the number of pupils they educate and that the gap between the independent and state sector has been increasing in this respect. Recruitment

[4] Part of the analysis uses comparisons with Wales, where the national strategies were not adopted.

from the state sector has been an especially important source of new teaching staff for independent schools. Independent school teachers have some advantages over those in the state sector – for example, they work with fewer pupils and enjoy longer holidays.[5] Also, there is evidence of a substantial pay premium for independent school teachers trained in shortage subjects.

Finally, Besley and Machin (2008) analyse the relationship between school performance and the pay or turnover of school principals. They find a relationship which is extremely robust in both cases. Their results show that labour markets for public sector school leaders may play an important role in rewarding performance when organisations have some flexibility to adjust pay for the purposes of recruitment and retention. They also argue that the debate around public sector reform has frequently focused too quickly on the role of explicit incentive schemes for public servants, forgetting that implicit incentives are already working through the labour market.

In this conference, we are especially interested in policy measures to help alleviate poverty and inequality. Given that the evidence firmly establishes a link between pay and teacher recruitment and retention and a link between principal's pay/turnover and school performance, perhaps one possibility for policy would be to do more to boost teacher and/or principal pay in schools within disadvantaged areas. In fact, this is one of Richard Layard's recommendations in the 'Good Childhood Report' (forthcoming). He notes that in the 1960s, the Plowden Report recommended higher pay for teachers in deprived areas and this arrangement continued until the 1980s when it was dropped. He argues that 'there is every reason to re-introduce higher pay for teachers in schools with a high proportion of children on free school meals'.

Output-orientated Approaches

Accountability policies

The main accountability policies in England are the publication of School Performance Tables for both primary and secondary schools and school inspections by the Office for Standards in Education (Ofsted). Performance Tables (or 'league tables') and inspection rounds of schools were introduced in the early 1990s alongside other 'market based' reforms (discussed below). The publication of test results at age 11 and 16 (i.e. in the Performance Tables) has been very controversial and the practice has been abolished in Scotland, Wales and Northern Ireland. The same concerns arise as in the context of the US: manipulation about who can enter the exams; concentration of those pupils close to the relevant threshold; and 'teaching to the test'. There is a literature about the limitations of information contained in the Performance Tables for assessing school effectiveness (e.g. Goldstein, 1997).

[5] On average, pupil-teacher ratios are about half the size in the independent sector compared to the state sector (i.e. 10 fewer pupils per class).

A recent study by Hussain (2007) focuses on the consequences of the school inspection regime. Schools are inspected by a team of inspectors once every few years and quality ratings (in the form of inspection reports) are publicly disclosed. If a school fails the inspection, there are severe consequences for the school. However, the fact that parents have choice (at least in principle) about where they send their children to school means that the inspection grade can have consequences for the school in terms of pupil numbers (and therefore funding). Hussain (2007) has evaluated the inspection regime in a very careful way, using variation in the timing of inspections to identify their causal impact. He finds that both fail ratings and very good ratings have an effect on enrolment and that there is a similar response for schools with above and below median levels of deprivation. He also finds that a very good school report is reflected in the wages of principals whereas principal exit rates are very responsive to getting the worst possible result. All this constitutes evidence that the school accountability system does generate incentives that have real consequences for schools and teachers. However, of most concern is the (tentative) result that performance at 'very bad' schools neither improves nor deteriorates after the inspection. He suggests that a possible interpretation might be that replacing the head of the organisation, without altering other features of the system, such as inflexibility in hiring and firing practices, does not result in significant changes in performance.

School Choice

In the UK, school choice has been an important component of the 'quasi-market reforms' since the 1980s (particularly since the 1988 Education Act). In theory, parents can apply to send their children to any school and schools must admit them. In practice, good schools in urban areas are often over-subscribed, in which case schools are allowed to apply over-subscription criteria. The most prominent criterion is usually living within some defined catchment area.

As in the US, the hope has been that a more competitive environment will boost productivity. There is relatively little UK evidence on this issue. Bradley et al. (2001) find that schools with the best examination performance grew most quickly and that increased competition between schools led to improved exam performance. In a study about primary schools, Gibbons et al (2006) evaluate whether primary schools in England facing more competition perform better than schools in less competitive situations and whether parents who have more choice of where to send their children actually see gains for their children in terms of academic performance. They find little evidence of a link between choice and achievement and only a small positive association between competition and school performance (which is not causal). The only case where choice and competition seem beneficial is in faith primary schools (attended by about a fifth of pupils). This may indicate more scope for improvement if choice and competition is coupled with other changes in governance and admission arrangements.[6]

[6] Faith schools have more autonomy from Local Authorities than do other state schools.

However, as in the US, there has been much concern that choice and competition may exacerbate educational inequalities. Parents are not equal in the extent to which they can exercise choice. For example, there is evidence that high income parents choose to live near high performing schools and pay a premium in the housing market (Gibbons and Machin, 2003; Rosenthal, 2003). There is also evidence to suggest that high socio-economic groups have better information on and understanding of school performance, for example via 'league tables' (West and Pennell, 1999). The inability to exercise choice could lead to educational segregation, which children from disadvantaged families having to make do with the schools that more advantaged parents do not want to send their children to. The extent to which segregation has changed over time is very controversial; different methods produce different results (Allen and Vignoles, 2006; Goldstein and Noden, 2003; Gorard and Fitz, 1998).

A major problem with the application of quasi-market measures to the education sector is that schools are not like firms: they do not close down when they no longer make a profit and hence there is no automatic mechanism to trigger the exit of failing schools. This means that pupils at failing schools which turn out to be unpopular might be stuck there for a considerable period. A danger is that children from poor families are made to pay the price for a potential productivity gain somewhere else in the education system. This has a productivity cost in itself as able pupils from poor families will not achieve their potential. Thus, there is reasons to question the efficacy and fairness of 'choice and competition' as a school improvement strategy.

Concluding Remarks

I would agree with the conclusions of Brian Jacob and Jens Ludwig – rigorous research has identified a number of intervention strategies that seem capable of improving the school outcomes of disadvantaged children. However, school-level interventions are not the only way (and should not be the exclusive way) to address these problems. Broader social policy is also extremely important.[7]

In the UK, it has become quite commonplace to say the public expenditure has not been well spent on schools over recent years. This is often based on the most superficial analysis. Rigorous research can and has shown that increases in public expenditure have been important in bringing about change – both in general and in the context of specific interventions. In fact, the UK only spends the OECD average on education (about 5.6% of national income). Given the importance of education to the economy, one question is whether that is really enough.

Of course, the impact of expenditure is not independent of how it is spent. One of the reasons why rigorous evaluation of new initiatives is so important is to find out what really works and how

[7] As one example, Goux and Maurin (2005) show evidence of a a relationship between overcrowded housing and children's performance at school in France.

different policies compare to one another in terms of cost-effectiveness. In particular, the possibility that incentive schemes will affect behaviour in ways not intended (or desired) by the policy maker is something that needs to be closely monitored.

Finally, although choice is a popular buzzword in education, almost by definition, those in poverty are people who are not able to exercise 'choice'. This may be because they get 'crowded out' of the best areas in which to send their children to school (because they can't afford a house in 'good' catchment areas) or because they do not have the resources (such as education) to fully understand and make the best use of information about schools. Indeed, given that about a fifth of the population are not functionally literate, this would not be surprising. A potential consequence of a choice-based system is that disadvantaged people have to take up the 'choices' that others do not want to make. If choice and competition are here to stay, then a big policy question is how to actively discriminate in favour of those from disadvantaged backgrounds to ensure that inequality and social mobility do not become even more problematic issues than they already are.

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Common Across the Atlantic: The Underrepresentation of Low-Income Students in Higher Education in the US and the UK*

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Introduction

The provision of opportunities to succeed in higher education for students from all socio-economic backgrounds has been central to the justification of public support for higher education. Since at least the report of the Truman Commission (1947) in the US and the report of the Robbins Commission in the UK,[1] review of evidence on the distribution of student achievement and collegiate attainment by socio-economic circumstances has led to calls for policies to increase opportunities for low-income students in higher education. The language of these reports is quite clear – and at times eloquent – in calling for expanded opportunities for low-income students and, indeed making the case that underinvestment in higher education posed a threat to national economic well-being and even national security. Yet, despite institutional expansion and increased college going suggesting some "democratization" of higher education over the last half century, substantial gaps persist in both the UK and the US in collegiate outcomes by socio-economic status.

To be sure, there have been dramatic changes in collegiate attainment in the US and the UK since the 1960s. In the US, the proportion of the population age 25-29 with a BA degree or above increased from about 11% in 1960 to nearly 30% in 20072; while gains in the UK were yet more dramatic. The rising tide of collegiate attainment has not eliminated the gap by family background in attainment and, indeed, the gap appears to have widened somewhat in the last two decades. Because there are substantial gaps in secondary achievement by family circumstances, this analysis concentrates on understanding the differences in college going and completion by family income conditional on achievement.

Certainly one commonly referenced explanatory factor in understanding this difference is that young people from different socio-economic circumstances receive quite different educational experiences in the pre-school, elementary and secondary school years. As a result, at the point of college entry there are significant average differences in achievement and, in turn, preparation to succeed in a rigorous collegiate curriculum. As such, it is often asked whether differences in enrollment and attainment by family background can be explained by differences in educational policies and family investments occurring well before the point of collegiate entry (the subjects of Jacob and Waldfogel).

Yet, accounting for differences taking shape in the years before college entry, it is unambiguously the case that there remain gaps in collegiate enrollment and attainment conditional on precollegiate achievement for young people in the US and the UK based on family circumstances or high school opportunities. What is more, the gaps appear to widen when outcomes are defined

[1] More formally, the report *Higher Education for American Democracy* was commissioned by US President Harry S. Truman; the committee was chaired by George F. Zook. What is known as the Robbin's Committee generated the volume *Higher Education: Report of the Committee appointed by the Prime Minister under the Chairmanship of Lord Robbins 1961-63.*

[2] *Digest of Education Statistics* (Table 8, 2007).

in terms of attendance at a relatively resource-intensive institution or degree completion. An initial focus of this analysis is on identifying the cross-country differences in college going and collegiate attainment tied to family circumstances at the point of college entry. Conditional on student achievement, many of the most significant differences between low-income and high-income students occur across the dimensions of college choice, rather than at the simple dichotomous margin of college entry.

Despite some striking similarities in college participation by socioeconomic status, the "markets" for higher education are dramatically different in the US and the UK. The US market is distinguished by considerable decentralization and institutional diversity, with public and non-profit providers differing substantially in total resources, tuition charges and financial aid. On the other hand, higher education in the UK is highly centralized with fees (until recently) essentially set at the national level and the application process carried out through a very centralized system. Indeed, the dramatic differences in the higher education market structures between the US and the UK should provide some evidence on how different institutional structures and market mechanisms affect collegiate attainment. Still, it is clear that raising collegiate attainment among those from relatively disadvantaged circumstances is a substantial challenge that defies national boundaries.

The first section of this paper presents some basic fact-finding, covering the overall collegiate attainment rates by family circumstances in the US and the UK, considering differences over time and by type of institution. The second section places these outcomes in the context of the quite different market structures across countries, focusing on the varying degrees of decentralization, funding mechanism and determinants of tuition and financial aid. Given substantial cross-country differences in the higher education market, the next section presents an analysis of the extent to which tuition prices, financial aid and the persistence of credit constraints limit collegiate attainment in the US and the UK. As credit constraints cannot fully explain differences in collegiate attainment, the process of how students from different economic circumstances negotiate the process of college application, admission and choice presents the next step in the analysis. Of particular interest is the extent to which the application process exacerbates differences by family background in collegiate outcomes. The final section offers some evaluation of potential policy interventions and consideration of the information that researchers and policy makers most need in order to target resources to most effectively increase collegiate opportunities for students from low-income families.

1. Fact Finding

Collegiate Attainment in the US and the UK

Overall, college enrollment and completion of BA-level degrees have increased substantially over the last three decades in both the United States and the United Kingdom.

Yet, the rising tide of increased collegiate attainment propelled by growth in the economic returns to college has not produced equivalent gains for students from all socio-economic circumstances. In the US, college enrollment in the years following high school graduation increased dramatically from 47.7% for the high school class of 1972 to nearly 72% for the high school class of 1992. While gaps in college enrollment by family circumstances persist, the largest gains in enrollment (26.2 percentage points or 83.5%) accrued to students in the lowest income group (Table 1). Yet, the very large gains in enrollment among low income students have not translated to similar gains in collegiate attainment, as the rate of degree completion conditional on college entry fell over this interval for all but the most affluent students. College completion rates fell most dramatically for students in the bottom two income groups, as shown in the second column of Table 1. The net result is that increases in BA degree attainment among high school graduates have been largest among students from relatively well-off parental circumstances. For relatively high income students in the US, the likelihood of a high school graduate receiving a BA degree increased from about 40.6% to 53.3% between the 1972 and 1992, while students in the bottom income bin found more modest gains in BA attainment, with the likelihood of degree receipt rising form 12.3% to 15.9% (See Table 1). What is notable is the extent to which differences in attainment by family circumstances widen as one moves from college enrollment to college completion.

For young people in the UK, there are similar gaps in collegiate attainment by family circumstances.[3] Following tabulations from Blanden, Gregg and Machin (2005), college completion by age 23 among those from the top-fifth of the income distribution rose from 37% to 44% from the college entry cohorts of 1970 to 1995, while the cohort fraction receiving a BA (or first university degree) rose from 7% to 10% for from the bottom fifth of the income distribution. Indeed, the conclusion from the UK in terms of basic participation by family circumstances: while low-income students are unambiguously more likely to participate in higher education than in prior decades, the gap between low-income students and high income students is persistent.[4] Moreover, while one intent of the expansion of higher education in the UK in the four decades following the Robbins report was to democratize access, the outcomes are starkly different as the

[3] "Collegiate" in the US is used as a synonym for participation in higher education while in the UK the tern is more likely to describe the FE (16-19) sector.

[4] One should note that it appears to be somewhat more common to record the gap in university participation by family circumstances in the UK in terms of "social class" rather than income. Distinguishing professional, managerial and skilled (I, II, IIIn) from manual, semi-skilled and unskilled (IIIm, IV, V) makes clear a widening of the gap (in levels) accompanied the overall increase in the age participation index from the 1940s to 2000. Using the measure of social class, the difference in HE participation between higher and lower socio-economic groups narrowed between 1990 and 2000 as the participation rates increased from 35% to 41% and 11% to 22% for the higher and lower groups, respectively. By any measure, a stark gap remains.

Table 1: US College Enrollment and Completion by Parental Income in the US, various cohorts

Panel A: 1972			
Parental Income Category (1972/1992)	College Enrollment Among HS Graduates	BA Completion Among College Enrollees	BA Completion Among HS Graduates
<7500/25000	31.3%	39.3%	12.3%
10500/35000	43.2%	47.9%	20.7%
15000/50000	49.3%	50.7%	25.0%
>15000/50000	68.5%	59.3%	40.6%
Total	**47.7%**	**51.1%**	**24.4%**
Panel B: 1992			
Parental Income Category (1972/1992)	College Enrollment Among HS Graduates	BA Completion Among College Enrollees	BA Completion Among HS Graduates
<7500/25000	57.5%	27.7%	15.9%
10500/35000	66.4%	34.3%	22.8%
15000/50000	73.6%	42.6%	31.3%
>15000/50000	86.6%	61.6%	53.3%
Total	**71.8%**	**45.3%**	**32.5%**

1 Source: Authors' tabulations from the NELS:88 and NLS72 surveys. NLS72 calculations were made using the fifth follow-up weights included in the survey. Fourth follow-up weights were used for the NELS:88 survey calculations. Only those participating in these follow-ups are included in the tabulations.

2 The NLS72 and NELS:88 samples are restricted to those who attend college within 2 years of cohort high school graduation. Cohort high school graduation June 1972 in NLS72 and June 1992 in NELS:88.

3 Parental income in NLS72 and NELS:88 are given in discrete ranges in both surveys. We group the income ranges into 4 income categories in each survey that correspond to the same real income across surveys using the CPI. In NLS72, the real income ranges are less than $7500, $7501-$10500, $10501-$15000, and greater than $15000. In NELS:88, the real income ranges are less than $25000, $25001-$35000, $35001-$50000, and greater than $50000.

link between parental income and education has strengthened and that, over the period from the 1970s to early 1990s, "Britain actually regressed in terms of educational and economic and social mobility" (Machin and Vignoles, 2004).

The long-term consequences of these changes for intergenerational inequality are magnified by the well-know shifts in the structure of earnings. Card and Lemieux (2001) note substantial increase in the college – high school wage premium for relatively young workers between 1975 and 1995. In the US the college premium for young workers rose from about 9.9% to about 34.6%, while in the UK the college premium rose from about 17.2% to about 30.6%. Card and Lemieux (2001) show that much of the increase in the return to collegiate attainment over this period in both the UK and the US can be traced to intercohort changes in the relative supply of college educated

workers, driven by a slowdown in the rate of growth of educational attainment starting with cohorts born in the early 1950s. Rising returns to education exacerbate the long-term consequences of barriers to collegiate attainment for low-income students.

Precollegiate Achievement and Attainment

Strong causal statements about the trends in collegiate outcomes by family circumstances should be tempered with the recognition that family economic circumstances are likely to be correlated with preparation for college. Those students from the most economically disadvantaged families are disproportionately likely to have experienced relatively low quality elementary and secondary options, in addition to lower resources in the family. In both the US and the UK, differences in outcomes by family circumstances widen further between secondary education and higher education. Differences by family circumstances in college preparation within secondary education as well as differences in college choices magnify the barriers to university attendance for students from low-income families and the least advantaged secondary schools.

One line of argument suggests that the underrepresentation of low-income students in higher education is caused by sustained gaps in precollegiate achievement, generated in part by differences in educational resources from early childhood through high school. Consider the extent to which differences in college-going and attainment by family circumstances persist conditional on measured student achievement at the end of high school or secondary years in Figure 1.[5] The top panel of Figure 1 shows enrollment and the bottom panel of Figure 1 shows completion conditional on enrollment for students from 1992 high school cohort. To be sure, there are gaps in college participation by family circumstances conditional on student achievement, with these gaps somewhat larger in the second and third math quartiles than among the highest scoring students.

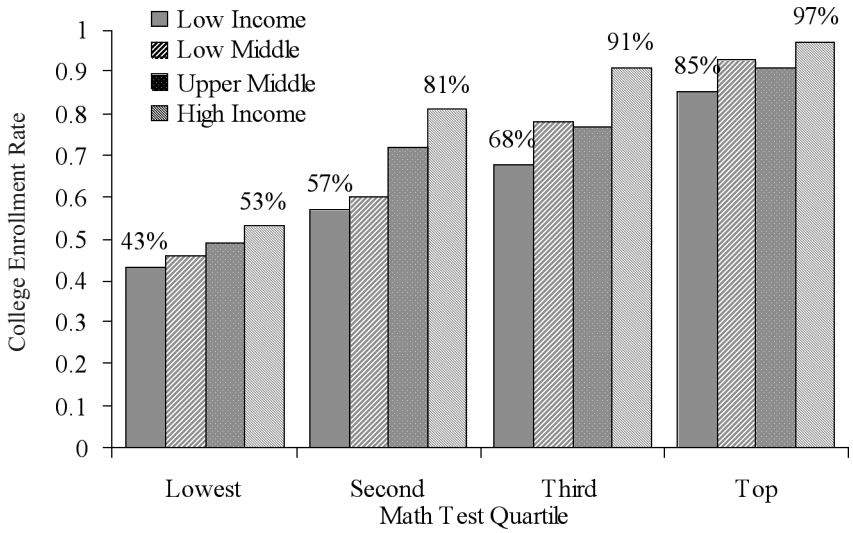
More striking is the observation that the gap by family circumstances widens when we examine college completion or attainment rather than college enrollment in the US.[6] When degree attainment is considered in the second panel of Figure 1, the gap between relatively high income and relatively low income students from the top test quartile in widens markedly. One explanation for this rising gap in attainment is that the true effects of differences in observed and unobserved pre-collegiate preparation are simply magnified during the college years. A different explanation is that family circumstances affect college selection and how students match with colleges and

[5] Two more subtle lines of argument deserve acknowledgment, even as they are more difficult to address empirically. The first concerns the extent to which pre-collegiate achievement accurately captures capacity to benefit from college enrollment; if typical measures of secondary achievement are only weakly correlated with success in college, it is important to understand what other determinants affect collegiate success. The second question is whether achievement measures are more (or less) predictive of collegiate success for students from different economic circumstances.

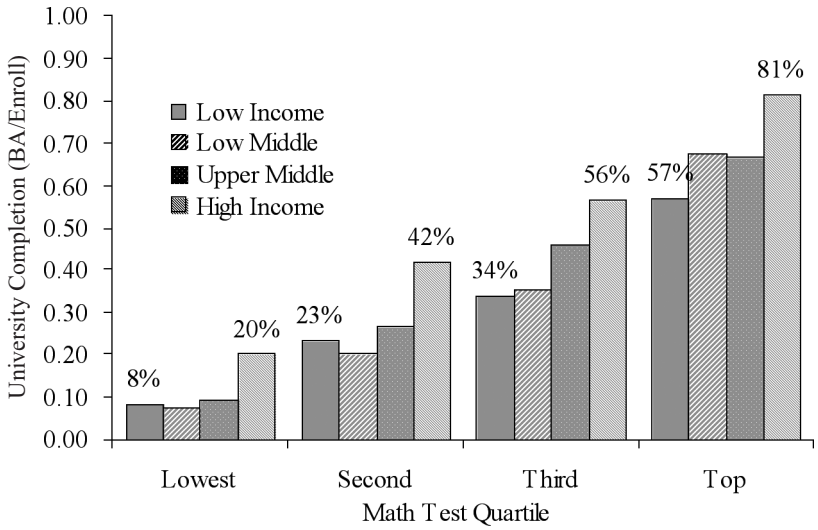
[6] Indeed, there is evidence in the US that the policy dialogue has been inordinately focused on "college access" at the expense of careful consideration of the determinants of degree completion and attainment. Because it is attainment not "touching college" that generates the largest economic rewards, there is a strong case to focus policy attention on how student aid policies, combined with institutional resources, affect student success in college.

Figure 1: Measures of Progression to Higher Education by High School Achievement and Family Circumstances

Panel A: College Enrollment



Panel B: College Completion



Source: Tabulations from the NELS:88 based on analysis in Bound, Lovenheim and Turner (2008). In NELS:88, the real income ranges are less than $25,000, $25,001-$35,000, $35,001-$50,000, and greater than $50,000.

universities, as relatively high income students are more likely to match with relatively resource-intensive colleges and universities.

In the UK, tracking the pipeline of high-achieving students is simplified by centralized examination at age 16 in the form of the GCSE (General Certificate of Secondary Education, formerly O-level). Focusing on those students in the top quintile of this measure of achievement at state (public) schools, Crawford, Machin and Vignoles (2008) then consider the progression of these students through subsequent stages, including A-levels and progression to higher education. For students in the bottom income quintile, the achievement gap at age 16 is striking: only 4% of young men and 6% of young women score in the top fifth of the GCSE distribution. Among the more affluent students, 16% of young men and 24% of young women score in the top fifth. In turn, it is the least affluent students who are overrepresented in the bottom quintile of GCSE scores, with 44% of young men and 33% of young women from the bottom income quintile in this category. Such dramatic differences in achievement by family circumstances at age 16 underscore the point made in Chowdry et al. (2008) that much of the gap in higher education participation in the UK can be traced to achievement differences between poorer and richer students established prior to secondary education.

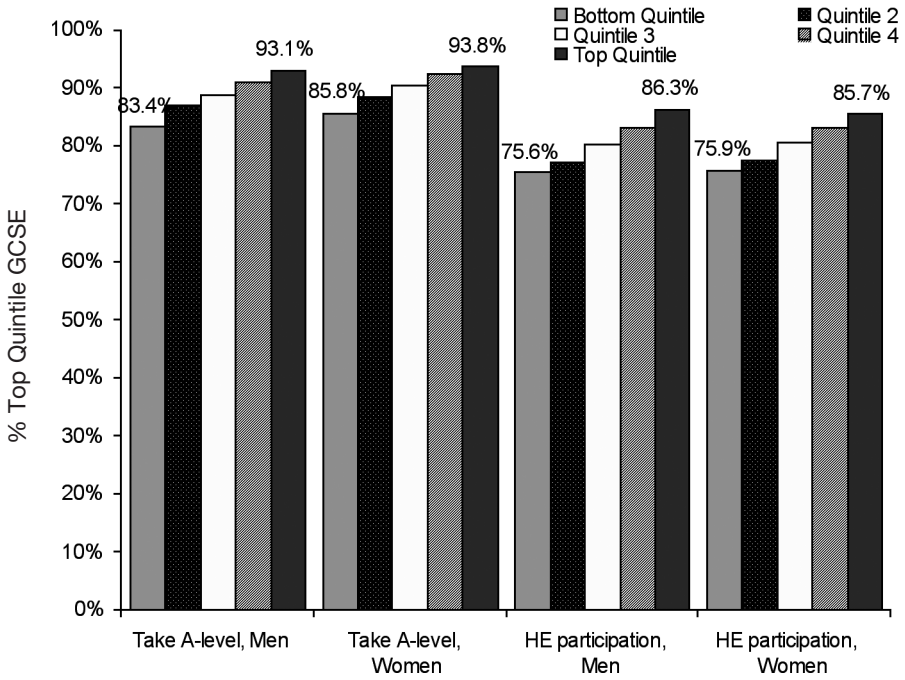
Yet, even with the relatively modest representation of low-income students among the highest achievers at the GCSE stage, attainment erodes further in the progression to A-levels, participation in higher education and participation at top-tier institutions, as represented by attendance at Russell Group institutions. Figure 2 shows the differential transitions by quintile, focusing on the high-achieving students (as indicated by those in the top quintile of the GCSE). For men and women in the two lowest socioeconomic status (SES) groups, ground is lost at each step—taking the A-levels, enrolling in any higher education institution and selecting a top-tier university. By the end of this chain, for men, the likelihood of attending a Russell group institution for those starting in the select top quintile of GCSE scores is 44% for the most affluent students and about 37% for those in the bottom two quintiles; for women, the likelihood of attending a Russell group institution is 38.3% for affluent students and about 30% for those in the bottom two quintiles.[7]

In thinking through the data (admittedly not fully comparable) for the US and the UK on the link between secondary high school performance and college participation several general points merit emphasis. First, pre-collegiate achievement gaps by socio-economic circumstances are appreciable in both the US and the UK and tend to increase not decrease as students move through the secondary school years. In the UK, the mapping between precollegiate attainment (A-level scores) and college participation is much tighter than it is in the US In part because there are many more community colleges and fully "open-access" institutions in the US relative to the UK, it is much more common for students with below median achievement (particularly from relatively affluent

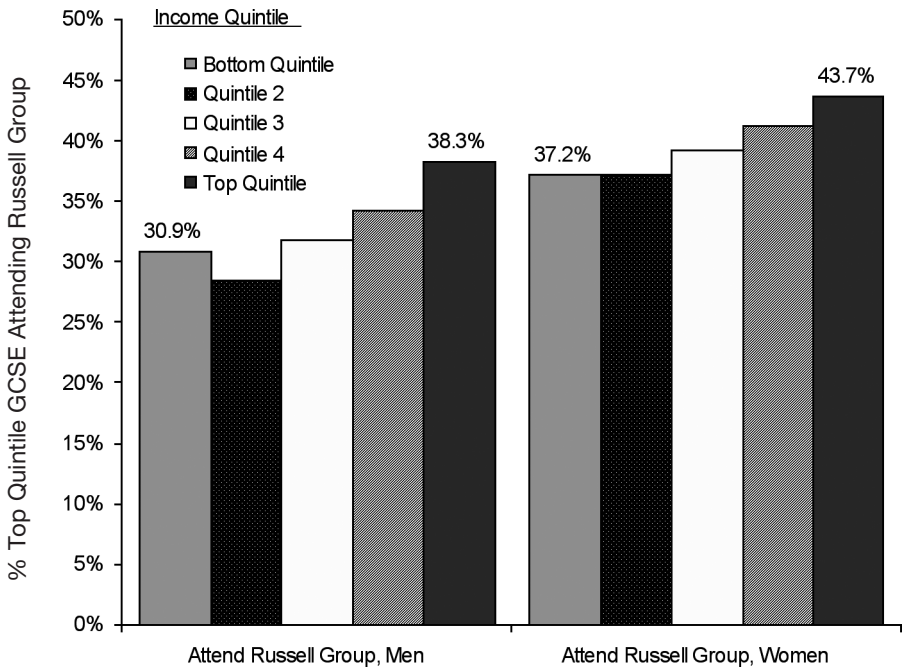
[7] Significantly, high-achieving, low-income students are more likely to attend an elite university if their secondary schools have a history of strong GCSE scores and low rates of poor and special needs students. The association between secondary school characteristics and higher education outcomes is weaker for high-income students with similarly strong achievement (Crawford, Machin, and Vignoles 2008, 19-20).

Figure 2: Measures of Progression to Higher Education for Students in the Top Quintile of the GCSE Distribution

Panel A. A-Level Completion and Higher Education Participation



Panel B. Attendance at Russell Group University



Source: Crawford, Machin, and Chowdry (2008).

families) to participate in higher education in the US than the UK Yet, even as there appear to be considerably greater opportunities for collegiate participation for students with low precollegiate performance in the US relative to the UK, the rate at which students with weak high school achievement complete BA degrees in the US is very low (only about 5% of high school graduates from the bottom quartile of the distribution on math scores complete a BA degree).

Differences in Enrollment and Attainment by Type of College and University

In both the US and the U.K, there is considerable heterogeneity in collegiate options. The match between students and collegiate characteristics is significant for (at least) two reasons. First, collegiate characteristics may affect attainment and college completion, with additional resources increasing the return to further study. Secondly, choice of college may affect the return to education, in turn impacting long-term economic outcomes and the opportunities for social mobility, as positions in elite colleges are often viewed as pathways to leadership positions. Still, the measurement of the returns to college quality is necessarily difficult given the two-sided selection process determining the matching of students and schools.[8] That some institutions in the US and the UK face considerable excess demand can be taken as a less formal revealed preference demonstration of the presence of differential benefits to colleges.

Some descriptive evidence on the distribution of students by income and different institutional types follows in Table 2. Focusing on students in the top two quartiles of the achievement distribution, this presentation shows the link between family circumstances and type of first institution within the top two achievement quartiles for 1992 among US students enrolling in college. The distinctive feature of this presentation is the substantial gap separating the college choices for students in the top income group from those in the lower income group. Within the top achievement quartile, high income students are more than twice times as likely to attend a highly selective private institution while about one half as likely to start postsecondary education at a community college. The implications of these different distributions of college choice depend on the causal impact of different post-secondary experiences on educational attainment and later life outcomes, which is plainly difficult to untangle because observed differences in outcomes by type of institution capture both the direct effect of institutions (and resources) on attainment and the differential selection of students into institutions based on both observed and unobserved achievement factors. Descriptively, there are large differences among institution types in the likelihood that entering students complete the BA and resources measured by student-faculty ratios (bottom panel of Table 2). High income students tend to be over-represented among entrants at the resource-intensive selective institutions in both the public and private sectors where completion rates are quite high while low income students are overrepresented among

[8] While somewhat mixed, available econometric evidence suggests that there is some non-trivial return to attending relatively selective institutions and that these returns are likely to be particularly large for those students from relatively low income families (Hoxby, 1998; Chevalier and Conlon, 2003). A study by Dale and Krueger (1998) that attempts to match students on unobservables does not find an overall return to college quality but does find an earnings premium to college quality for students from low-SES families.

Table 2: College Characteristics and Distribution of Enrollment for High-Achieving High School Students in the US

	Full Sample	Public 4-Yr Non Top 50	Public 4-Yr Top 50	Private 4-Yr Less Selective	Private 4-Yr Highly Selective	2-year Colleges
Lowest Income Group: Distribution of College Enrollment (NELS)						
Third Math Quartile		0.31	0.07	0.07	0.01	0.54
Top Math Quartile		0.40	0.11	0.16	0.08	0.26
Highest Income Group: Distribution of College Enrollment (NELS)						
Third Math Quartile		0.35	0.10	0.15	0.05	0.36
Top Math Quartile		0.32	0.21	0.18	0.17	0.12
	College and University Characteristics					
	College completion conditional on enrollment					
NELS:88	45.3	50	83.7	73.4	91.1	17.4
	Mean Student / Faculty Ratios					
NELS:88	34.7	28	17.2	23.3	12	53.6

Source: Tabulations from the NELS:88 based on analysis in Bound, Lovenheim and Turner (2008).

entering students at institutions like community colleges and non-top tier public universities where the likelihood of completion is much lower.

Bound, Lovenheim and Turner (2008) examine the aggregate decline in college completion from 51.1% to 45.3% for the two cohorts from the high school classes of 1972 and 1992 and find that declines are concentrated among those who began their post-secondary careers in a non-top 50 ranked public school or a community college. While declines in the preparation of entering students explain some of the erosion in completion rates, increased stratification in US higher education and reductions in collegiate resources at institutions outside the top-tier of universities are an important explanation for the changes in the college completion rates. Given the relative concentration of less affluent students at these institutions, the increased stratification in the market for higher education appears to have generated adverse distributional consequences.

Representation of Low-Income Students at the Elite US Colleges and Universities

Using data from a set of institutional files assembled from selective colleges and universities [Expanded College and Beyond, 1995 Entering Cohort], Bowen, Kurzweil and Tobin (2005) estimate that only about 9% of the entering undergraduate class at Ivy League universities is from the bottom quartile of the family income distribution, with similar underrepresentation of 12% and 10% for selective public universities and liberal arts colleges.[9] Using the distribution of family income afforded by the COFHE survey, Hill and Winston (2005) produce a parallel accounting for 2001-2002 and, in these data, low and moderate income students are dramatically underrepresented at these selective private universities with more than 70% of students at the 28 schools coming from families with income over $90,000, with this measuring increasing to 72% for Ivy League universities. While there are a number of problems with using receipt of federal Pell grants, which are available only to quite poor students as a precise indicator of college and university success in recruiting low-income students (Tebbs and Turner, 2005), the presentation shown in Table 3 by specific institution is nevertheless a strong reminder of how different the elite colleges and universities are in their representation of low-income students. To illustrate, while Pell grant recipients are about 24% of students at all private 4-year colleges, they account for less than 15% (and often less than 10%) of undergraduate students the most-selective private colleges and universities.

How one interprets the degree of underrepresentation implicit in these distributions depends crucially, then, on how large the pool of students is with the academic achievement to succeed at these institutions. There is no question that students at these elite institutions are high achieving as illustrated by the interquartile range in test scores in Table 3. At question is whether there is a substantial pool of potential students from low income families who also meet these criteria who do not enroll at these institutions. Hill and Winston (2005) address this question by calculating the distribution of students by income and achievement test scores. Figure 3 presents the total distribution of students by family income (the thick black line) and the distribution of students scoring greater than 1420 and 1220 respectively. Low income students are relatively underrepresented among high scorers: for example, students from families with income less than $32,416 are 38.5% of all test takers they are only 18.2% of students scoring above 1220 on either the ACT or SAT test. Moving somewhat up the income distribution to include students from families with income less than $50,890, the gap persists with 60% of test-takers included in this population, but only 38.1% of test-takers scoring above 1220. Still, even as there is an empirical association between family circumstances and test scores, the presentation makes clear that the fraction of low and moderate income students with test scores plausibly positioning them for

[9] The data on the underrepresentation of low-income students at relatively resource intensive colleges and universities are compiled from a number of sources, each with some notable imperfections, though all pointing in the same direction. In the main, estimating the distribution of family income is difficult in institutional data in the US as family resources are only known for those who apply for financial aid and must be approximated for the remainder of undergraduates at an institution. Alternatively, micro-data surveys such as the National Educational Longitudinal Study rarely include enough individuals to allow for the measurement of institution-specific variation in representation of students by family circumstances.

Table 3: Characteristics and representation of low income students top-tier US College and universities

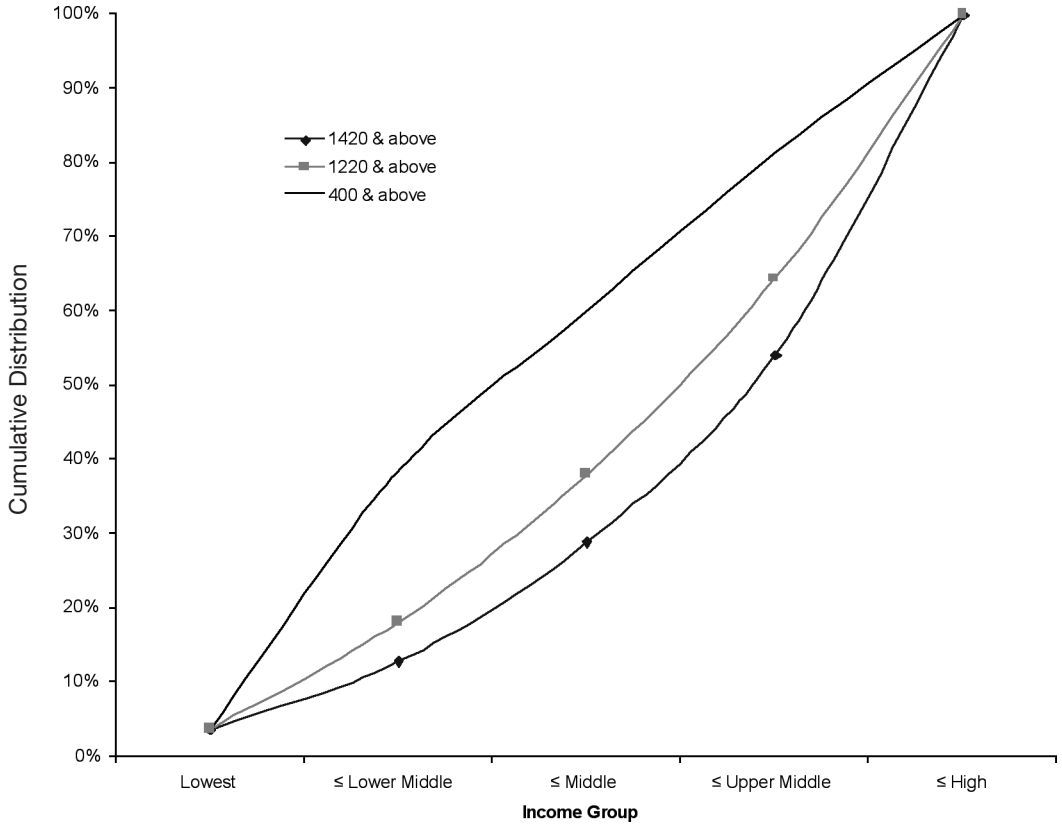
US News Rank	Private Universities	SAT Range, 2007[1]	S/F Ratio, 2007[1]	Total Dependent Students, 2005-2006[2]	Pell Grants as Percentage of 12-month Enrollments 2005-2006[2]
	Top Private Universities				
1	Princeton University	1370-1590	5/1	4242	8
2	Harvard University	1390-1590	7/1	7456	6
3	Yale University	1390-1580	6/1	5380	8
4	Stanford University	1340-1540	6/1	6097	12
5	University of Pennsylvania	1330-1530	6/1	9947	9
5	California Institute of Technology	1470-1570	3/1	806	13
7	Massachusetts Institute of Technology	1380-1560	7/1	3715	13
8	Duke University	1350-1540	8/1	6121	9
9	Columbia University	1330-1540	6/1	7867	11
9	University of Chicago	1320-1530	6/1	4163	11
	Average of Private 4-year Not for Profits			*1348*	*24*
	Top Public Universities				
21	University of California – Berkeley	1200-1450	15/1	22666	27
23	University of Virginia	1220-1430	15/1	12206	7
25	University of California – Los Angeles	1180-1410	16/1	26029	29
25	University of Michigan – Ann Arbor	27-31 (ACT)	15/1	*	*
28	University of North Carolina – Chapel Hill	1200-1390	14/1	14182	14
	Average of Public 4-year Schools			*6857*	*20*
	Average of Public 2-year Schools			*3447*	*18*
	Top Liberal Arts Colleges (College Rank)				
1	Williams College	1320-1520	7/1	1884	12
2	Amherst College	1330-1530	8/1	1534	12
3	Swarthmore College	1320-1530	8/1	1337	11
4	Wellesley College	1310-1470	9/1	2188	14
5	Carleton College	1330-1490	9/1	1745	11
5	Middlebury College	1270-1480	9/1	3523	5
7	Pomona College	1370-1520	8/1	1383	10
7	Bowdoin College	1300-1480	10/1	1645	12
9	Davidson College	1250-1440	10/1	1626	6
10	Haverford College	1290-1500	8/1	1118	9
	Average of Private 4-year Not for Profits			*1348*	*24*

Source

[1] US News and World Report. Available: http://colleges.usnews.rankingsandreviews.com/usnews/edu/college/rankings/brief/t1natudoc_brief.php

[2] Economic Diversity. Available: http://www.economicdiversity.org/

Figure 3: Distribution of SAT and ACT Test-Takers by Family Income



Source: Hill, C. and G. Winston. 2005. "Access to the Most Selective Private Colleges by High Ability, Low-income Students: Are they out there?" Williams Project on the Economics of Higher Education Working Paper, DP-69.

enrollment at the most selective institutions far exceeds their representation among students enrolling at these institutions.[10]

Representation of Low-Income Students at the Elite UK Universities

In the U.K, the differential in representation by family circumstances at the more selective and most resource-intensive universities is equally striking. Table 4 presents a list of Russell group universities and the associated representation of students by family socio-economic status, disadvantaged neighborhood, and state schools. Plainly, there differentials are substantial and

[10] Hill and Winston (2005) are precise in thinking through the implications of different target levels of pre-collegiate achievement on the supply of students to the elite institutions in answering the question "are they out there?". Hill and Winston calculate that at an ability threshold of 1300 for inclusion, the enrollment target for students from the bottom two quintiles of the income distribution would be 16%, implying a need for 4,400 students to matriculate out of a potential pool of 19,959 students from low-income families scoring at this level or above. At the more generous ability threshold of 1220, these selective schools would aim to recruit a pool of 5,005 students (representing 18.2% of the entering classes) relative to the 44,000 low-income students scoring in this range.

Table 4: Representative of low socio-economic status students at Russell Group universities, 2005-06

	Total Full-time undergraduate entrants	Percent from state schools or colleges	Percent from NS-SEC, classes 4,5,6 & 7	Percent from low participation neighborhoods
Total UK	385,625	87.9	29.8	14.6
Cardiff University	4,460	83.9	21.2	10.2
Imperial College of Science, Tech. & Medicine	1,370	61.3	17.3	7.1
King's College London	3,015	71.2	21.7	8.4
London School of Economics and Political Science	595	59.4	17.5	7.8
The Queen's University of Belfast	4,075	99.5	34.3	10.8
The University of Birmingham	4,600	76.5	20.0	8.9
The University of Bristol	3,080	65.1	16.4	5.5
The University of Cambridge(#4)				
The University of Edinburgh	3,970	65.5	17.7	9.0
The University of Glasgow	3,735	85.7	23.7	15.8
The University of Leeds	6,565	74.7	18.9	9.1
The University of Liverpool	4,030	86.4	23.6	12.6
The University of Manchester	6,655	77.7	20.7	11.2
The University of Newcastle-upon-Tyne	4,140	68.4	20.3	10.6
The University of Nottingham	5,435	67.3	16.9	7.2
The University of Oxford	2,925	53.7	11.4	5.0
The University of Sheffield	5,130	83.8	21.3	11.1
The University of Southampton	4,095	82.9	20.0	7.2
The University of Warwick	2,590	76.0	18.7	7.0
University College London	2,485	62.4	17.5	6.3

Source:
http://www.hesa.ac.uk/dox/performanceIndicators/0506/t1b_0506.xls

broadly similar to the outcomes at elite universities in the US With students in the UK applying to programs not universities, the underrepresentation of students from lower social classes is magnified in the most highly selective courses of study within high education institutions. Looking at medicine and dentistry courses, for instance, Universities UK found that 44% of accepted students in 2004 were from higher managerial and professional classes, but just 5% were from the semi-routine socio-economic groups.

The extent to which the underrepresentation of students from economically disadvantaged families can be explained by pre-collegiate differences is a matter of considerable discussion in the UK There is no question that the secondary school preparation accounts for a sizeable share of the gap though there is some disagreement as to whether deficits are manifested entirely at the pre-

qualification stage (Sutton Trust, 2008). Focusing on the representation of students performing in the top quintile of the GCSE examination, there is no question that high-achieving low-income students are underrepresented at the Russell Group institutions (bottom panel of Figure 1). Yet, much of this observed difference can be traced to A-level participation, subject matter at the A-levels, and performance on the A-level examinations. Econometric evidence presented in Chowdry, Crawford, Deardon, Goodman, and Vignoles (2008) suggests that the differential likelihood of attending one of the top-ranked UK institutions is largely eliminated for men and of a small magnitude for women once differences in A-level performance are taken into consideration in models with high school fixed effects (excluding independent school participants). How one interprets such estimates in a policy context depends on the extent to which the high school fixed effects are also capturing large socio-economic differences, reflecting neighborhoods, peers and the direct effects of relatively poor quality secondary schools.[11]

Yet, the effects of where students attend secondary school on the likelihood of participation in a top-tier higher education are particularly sharp. While independent schools education about 7% of students, nearly 40% of students matriculating at the leading universities enter from this path (Sutton Trust, 2004). As evidence of this concentration, further tabulations by the Sutton Trust (2007) show that 31% of matriculants to Oxford and Cambridge hailed from 100 secondary schools, with more than 3800 secondary schools nationwide. The emphasis of several reports by the Sutton Trust is on the underrepresentation of students from state schools and those from neighborhoods with traditionally low participation in the higher education at the most highly ranked institutions. Using HEFCE Performance Indicator benchmarks (which are in turn based on the subject matter and entry requirements at the institutional level), the Sutton Trust reports calculate the number of students from different groups expected to participate in top-tier institutions relative to actual participants. For 2004-05, it is estimated that there are 3700 students from state schools and about 840 students from low participation neighborhoods who are "missing" from the top-tier English universities (Sutton Trust, 2008, p.31). Such gaps raise questions about how students from different backgrounds and high school environments negotiate the university application process.

In both the US and the UK, achievement gaps evident in secondary school by family circumstances are substantial. Yet, even high-achieving low-income students are less likely to enroll in higher education and graduate from college than their more affluent peers. Differences in outcomes by family circumstances widen further in higher education, partly as a result of choices in secondary education and in the college choice process that magnify the barriers to attendance at a top-tier university for students from low-income families and the least advantaged secondary schools.

[11] Note that while it is not possible to "repeat" the analytic exercise of Chowdry et al. in US data, there is no question that high school effects are correlated with family economic circumstances in predicting collegiate outcomes. Pallais (2008) shows that the inclusion of high school fixed effects reduces (by a factor of 3.5) the difference between high and low income students in total applications while also reducing the differential in quality of the application portfolio by about 60%. The interpretation is that within a given high school the effects of family income are smaller the aggregate effects which are magnified by between-high school differences which are correlated with family circumstances.

While there is much similarity in higher education outcomes by family circumstances in the US and the UK, cross-country institutional differences in how students move from secondary school to university enrollment are substantial. For high-achieving students in the UK, the transition from GCSE exams to A-levels with-in secondary education is a major hurdle in progression; for high-achieving students in the US, the college application and college choice process is a point where differences by family circumstances further widen.

2. Market Structure – Comparing Higher Education in the US and the UK

Institutional Control: Differing mixes of Public and Private

That the gaps in collegiate attainment by family circumstances are so similar between the US and the UK is particularly striking given the market structures of higher education are radically different in these countries. The degree of centralization and public control is a central feature distinguishing higher education in the US and the UK In essence, the UK represents a unitary system of higher education where all of the institutions are part of a single national authority which determines funding for academics and research. In the US, institutional control of higher education institutions resides with states in the case of public institutions and independent self-perpetuating governing boards in the case of private non-profit colleges and universities.[12] In the US it is the states not the federal government that form the locus of funding and control for public institutions. Private non-profit colleges and universities (think Amherst College or Harvard University) are functionally independent entities, competing with public institutions in national and local markets. The role of the federal government in US higher education is concentrated in the determination of financial aid policies, research funding and regulation. A topic to return to in Section 4 is whether the relatively dramatic level of policy decentralization in US higher education relative to the UK leads to confusion, hampering the capacity of students to make the best collegiate investments.[13]

Different degrees of decentralization affect the amount of budgetary control exercised at the institutional level. At the extreme, private colleges and universities in the US make choices about

[12] The market for higher education in the US includes more than four thousand institutions in a mix of public, non-profit and for-profit competition. Specifically, in the US there are 4,314 degree granting institutions of higher education, of which 643 are public four-year institutions, 1,045 are public 2-year institutions (*Digest of Education Statistics,* Table 255). In the UK, there are naturally fewer institutions – 168 separate higher education institutions, with 106 classified as universities; focusing on England proper, there are 132 higher education institutions and 88 classified as universities (Universities UK, Facts and Figures).

[13] In the US, federal higher education policies include grants, loans, tax credits and savings incentives. At the state level, students are support through a combination of across-the-board subsidies to colleges and universities (which allow for below market tuition charges) and direct grants, often conditioned on need or merit. Noteworthy, then is the extent to which state variation leaves really 5different variants of public policies to higher education. Individual colleges and universities also have a great deal of latitude in deciding how to set tuition, allocate institutional aid and conduct undergraduate admissions.

tuition and the number of students to admit in accordance with market tradeoffs – additional revenue and changes in peer quality. Public colleges and universities in the US have some – though not complete – control over the price, quantity and resources per student, with local politics placing constraints of the degree to which public colleges can raise resources through tuition without incurring reductions in state appropriations. Particularly in recent decades, competition in US higher education has increased, especially in the highly integrated national market.[14]

Until reforms of 2004, centralization was nearly complete in UK higher education, with the government controlling both price and number of students per institution.[15] With a much more limited tradition of private philanthropy to support higher education in the U.K than the US, the result was a circumstance in which university faculty and administrators had few degrees of freedom for competition and limited opportunities to raise resources per student. Indeed, one commentary in the *Economist* (2004) noted "The price and quantity of courses are state-controlled, in a system more suited to Soviet style central planning than to a modern democracy."

While public support and public control are by no means synonymous, institutional control is directly related to revenue sources in higher education. In the UK, only about 11% of total higher education revenues come from resident student tuition and fees, with the bulk of support coming from Funding Council grants (39%) and research grants and contracts (16%). At public institutions in the US, a somewhat larger share or revenues come from tuition and fees (15.8%) while state appropriations remain a major budgetary item at 24.3%. Not surprisingly, private institutions in the US are more tuition dependent, with tuition and fees accounting for about 30% of total revenues and endowment returns (22% of total revenues) and private grants and gifts (12%) accounting other important revenue streams; though the considerable heterogeneity across institutions in tuition dependence and degree of endowment support merits note.

A central point is that nearly all university students in the US and the UK receive considerable subsidies, with tuition and fees far less than the cost of producing a university education. As such, the central questions for public policy concern both the level of subsidies to be provided to higher education and the distribution of these subsidies in accordance with student socio-economic circumstances and pre-collegiate achievement.

Differentiation and Stratification

Post-secondary programs in the US and the UK are quite differentiated in terms of resources per student and program offerings. Indeed, Hoxby (1998) describes both the vertical stratification of the market for higher education in the US and shift to an integrated and nationally competitive

[14] Hoxby and Long (1999) find unambiguous increases over time in the dispersion of resources per student across colleges; these within-college changes accounting for a substantial portion of the increase in the variance in the return to collegiate attainment.

[15] Barr (2004) provides the example of how St Andrews was penalized (fined £175,000) for exceeding enrollment targets following a surge in demand with the announcement of Prince William's matriculation.

market among the most selective colleges and universities, with market integration – and in turn competition – fuelled by reductions in transportation costs and institutional innovations such as standardized testing (ACT, SAT) facilitating the application and evaluation of students from across the country. Greater geographical integration in the US marketplace has plainly led to a greater concentration of the most able students at a relatively small number of institutions, in turn, raising quality at some institutions while reducing peer quality at other institutions. Despite the considerable press attention to the "elite" universities in both the public and private sectors in the US, the majority of students enrolled in a higher education in the US will attend a college or university outside this most selective tier, where there is still considerable heterogeneity in program quality and resources.

In the US, state systems have developed as purposefully stratified with community colleges, comprehensive four-year colleges and flagship universities serving somewhat different educational missions. Flagship universities (e.g., University of Michigan, University of Virginia) may compete with the best private universities for students and research funding; these institutions exercise selective admission at the undergraduate level. Other four-year public institutions operate in relatively local markets with admission requirements defined in statutory terms.

Higher education institutions in the UK are diverse in their history as well as resources and programming. The 165 higher education institutions of the UK were founded in four distinct waves, over a much longer horizon than the 2,500 four-year higher education institutions founded in the US since the mid 17th century. The first wave of UK universities, which are commonly referred to as the "ancients," were founded between 1167 and 1583. This group includes Oxford, Cambridge, St Andrews, Glasgow, Aberdeen, and Edinburgh. Founded in the 1850s with an orientation to professional and applied skills rather than strictly classical instruction, the civic "redbrick" universities include Birmingham, Bristol, Leeds, Liverpool, Manchester, and Sheffield. Embracing the expansion of higher education in the 1960s with the Robbins report, seventeen new "plate-glass" universities were founded including York, Bath and Kent.[16] The most recent phase of expansion occurred in 1992 when the Higher and Further Education Act gave forty-nine polytechnics "New" university status.

The higher education markets in the UK and the US also differ dramatically in their stratification – at both ends of the market. At the top, even Oxford and Cambridge are 'endowment poor' relative to the very top US universities, with the endowments of Oxford and Cambridge smaller than Harvard by more than a factor of 5, as these institutions fare no better than about 15th in the ranking of US university endowments (Sutton Trust, 2003). At the other end of the spectrum, the network of community colleges in the US does not have a direct counterpart in the UK.

[16] The Robbins report concluded, "We have shown how, both at home and abroad, higher education in the 1960's is in the process of great expansion." *Report of the Committee appointed by the Prime Minister under the Chairmanship of Lord Robbins.* October 1963, pg. 48.

A functional illustration of the stratification of resources in the US and UK in higher education follows from the consideration of the distribution of student-faculty ratios.[17] In the US, there is a considerable dispersion in student faculty ratios with the interquartile range spanning 18.3 to nearly 48.7. In the UK, the interquartile spread in observed student faculty ratios is a bit smaller, raging from 20.2 to 34.2. What is more, examination of broad-based distinctions of institutions by quality makes clear that attending a more highly-ranked institution is positively tied to resources per student, with the most selective private institutions in the US with maintaining an average of students to faculty of about 12. Courant, McPherson and Resch (2006) suggest a model in which such a configuration may be justified on efficiency grounds when there are economies of scale in the production of higher education and resources and student aptitude are compliments. The stratification of institutions by resource levels is salient to the discussion of enrollment of low-income students in that it leads to the questions of who pays and who benefits in differentiated systems of higher education. Plainly, as discussed in the first section, low-income students are not only underrepresented in higher education in totality, but the degree of underrepresentation is greatest at the most resource-intensive institutions.

In the remainder of this analysis, I turn to the consideration of college cost and college choice, considering how market failures may exacerbate the differences in collegiate attainment by family circumstances. The first question is whether high tuition and limited financial aid leave students unable to make good collegiate investments. Yet, while credit constraints are perhaps the most salient potential market failure affecting collegiate choice (at least to economists!), a closer look at the college choice process suggests that there are other likely institutional features of the application and admission process that reduce the choices of low-income students and limit the extent to which they are able to make optimal collegiate matches.

3. Credit Constraints, Tuition and Financial Aid

Pricing

There is no question that tuition levels have increased in the US and the UK These pricing changes have led to a volume of assertions that it is changes in tuition that limit enrollment of low-income students. For example, in 2003, US Representatives John A. Boehner and Howard P. "Buck" McKeon put forward a Congressional report entitled "The College Cost Crisis" which asserts that increases in tuition at public and private four year institutions are threatening to put college "out of reach" for low- and middle-income students.

[17] For the US, student-faculty measures are based on the student-weighted distribution faced by the cohort entering college in 1992, using tabulations from Bound, Lovenheim, and Turner (2008). For the U.K, student-faculty measures are tabulated based on 2000-01 indicators from the Higher Education Statistics Agency.

While there has been vocal policy discussion in the US about the extent to which tuition inhibits student enrollment, the volume of the debate in the UK has likely been much louder over what have been historically much lower levels of tuition. Indeed, prior to 1998 universities did not charge any fees and the first fees were introduced at the level of £1,000.[18] Even after the small fees were introduced in 1998, only 39% of students paid the full amount, with 42% paying no fees at all. Beginning with the Higher Education Act of 2004, some differential pricing was introduced as universities were allowed to charge any fee between £0 and £3,000, with the maximum fee increasing modestly in recent years to £3145 in 2008. Layered on this fee structure is a government financial aid system providing need-based aid and income contingent loans. It is clearly too soon to assess whether the top-up fees hinder enrollment and discerning such an effect may well be impossible, given that the higher fees at some institutions have been coupled with more aggressive outreach efforts and other bursaries (scholarships) targeted to low-income students. Still, the evidence from prior decades is unambiguous to the point that the low (or zero) tuition policies that persisted in the UK for several decades were not a sufficient condition to produce sustained gains in collegiate attainment in general or at the most resource-intensive universities for low-income students. Bowen, Kurzweil and Tobin write: "The British experience since World War II is a powerful answer to those in the United States who argue that access issues can be solved by holding down student charges." (p. 219)

In the last three decades in the US, tuition (in constant dollars) charged at public four-year and public two-year institutions has doubled. While many popular discussions focus on the changes in sticker price at the most selective private institutions, such changes are unlikely to affect the choices of students at the margin of college enrollment as most college students in the US are enrolled at schools where tuition is less than $6,000, not at schools where tuition approaches $30,000. Moreover, direct tuition costs in the US (as well as the UK) are often a minority of total costs of college attendance: In 2007-08, the average tuition for a resident student at a public four-year institution was $6,185 while the average total expenses (including room and board, transportation, books and supplies) for such students was $17,336 (Baum and Ma, 2007).

Financial Aid in the US

In discussing the expected impact of tuition increases on enrollment and attainment, we begin by noting that *if* students fully understand the market for higher education, behavior should respond to net price – the full price minus the value of financial aid. In this sense, the very high sticker prices at the most selective colleges and universities in the US are not the relevant indicators for low and moderate income students who are likely to be eligible for considerable financial aid.

[18] The Dearing Report, more formally known as the *National Committee of Inquiry into Higher Education* (1997) recommended the introduction of fees, along with the provision of an income contingent repayment scheme. Despite the wide attention generated by the introduction of fees, the impact of these fees the overall funding consequences for students and institutions appear to have been modest (Greenaway and Haynes, 2003).

While we expect the demand for college education to be decreasing in price, the change in the lifetime return to a college investment associated with recent tuition increases should be relatively small. Yet, if credit constraints limit college attainment for students from economically disadvantaged households, increases in tuition or other dimensions of college costs may well have much larger effects on attainment decisions.[19] Fitzpatrick and Turner (2007) find that overall college enrollment of those ages 17-19 is essentially inelastic, though there is a somewhat larger price response among those attending public two-year schools. In concluding that changes in tuition charges at public universities in the US have been a modest determinant of collegiate enrollment, it may well be that total college costs relative to ability to pay remain important in college choice and intensity of enrollment decisions.

In the US, there has been a vibrant policy discussion about the tradeoffs between "high tuition, high aid" policies and "low tuition" pricing strategies that dates to the 1960s. In the late 1960s, Hansen and Weisbrod (1969) argued that large state subsidies to support low tuition were both inequitable, in the sense that students receiving the largest subsidies at the state flagship universities were relatively affluent, and inefficient as the recipients of these subsidies would likely continue to enroll at selective public institutions if they were charged appreciably higher prices. Hansen and Weisbrod argued that tuition should more accurately reflect instructional costs, with public subsidies targeted to low-income students in the form of higher financial aid.

As institutions in the US have shifted to high(er) tuition, the questions to ask with respect to low-income students concern the extent to which changes in financial aid have accompanied increases in tuition and the extent to which individuals fully understand the changes in the availability of aid. There is no single, comprehensive "student financial aid policy" in the United States: students (their families) respond to an array of different policies at the federal, state and institutional levels. Indeed, this "complexity" in the allocation of financial aid means that students and their parents may face substantial difficulty in determining "net price" at the point of college application (Dynarski and Scott-Clayton, 2006).

At the federal level, financial aid policies include grants, loans, tax credits and savings incentives.[20] The first two prongs of federal policy – grants and loans – date to the Higher Education Act of 1965. Pell grants (once known as the Basic Educational Opportunity Grant) are awarded to students solely on the basis of financial need; today, the maximum Pell grant is set at $4,310 which is higher in real terms than the award level in the mid-1990s but still well below the constant dollar value of the program award from the mid-1970s (about $4,800). Given that college costs have risen over

[19] Measuring the effect of tuition changes on the demand for college is not altogether straightforward: comparisons across states are likely to confound differences in public college pricing with other systematic differences across states, such as income. At the same time, within-state approaches are not immune from critique as researchers should be concerned that changes in tuition at state-supported institutions are likely to be tied to a host of other changes in local economic conditions that also affect enrollment. The same factors affecting the determination of tuition on the supply-side of the market (e.g., recessionary periods within a state) may also affect the demand for college. In such circumstances, the counterfactual to raising tuition at public institutions may be lower resources per student as states essentially raise tuition to compensate for declines in appropriations.

[20] See Turner (2007) for a full outline of US federal financial aid, including tax credits and specially directed aid.

the last quarter century, the Pell grant now covers a lower share of the burden of paying for college than it did originally. The enrollment effects for traditional college-age students (defined as students who are recent high school graduates and still depend on their parents for financial support), evaluations consistently yield no evidence that the program changed enrollment (Hansen 1983; Kane 1994).[21] What is more, entering undergraduate students are limited to borrowing $3500 under the federal Stafford programs.[22] Tuition tax credits are non-refundable, implying that eligible students are unlikely to be among the most economically disadvantaged.[23]

Although the capacity – and willingness – of states to provide direct support to public universities over time has dwindled, the role of states in providing grant aid to students has increased markedly over the course of the last decade. Starting with programs in Georgia and Arkansas in 1993, an additional 11 states added programs by 2002. The defining characteristic of these programs is that they offer generous aid – often equal to tuition at the public university – for in-state students with academic achievement above a threshold (see Dynarski (2004) for a thorough discussion of these state level programs). The programs vary in their distributional consequences with some providing additional aid to the most economically disadvantaged eligible students (Florida and Arkansas) while in other states (Georgia, initially) federal aid led to reductions in state aid for those who were eligible for Pell grants.

The final source of financial aid for students comes directly from colleges and universities in the form of institutional aid. One form of such support is merit-based aid which is used to recruit students with particular characteristics such as high academic skills or particular athletic skills. The other primary form of financial aid provided by institutions is need-based grants. While there is a long tradition in US higher education emphasizing the provision of need-based financial aid, the reality is that it is only a very small number of colleges and universities that can afford to provide students with full need-based aid.

Indeed, among the most resource-intensive colleges and universities, need-based aid has become more generous in recent years. Colleges and universities have replaced loans with grants for students in the lowest income groups while extending the reach of need based aid to moderate and

[21] In one of the initial assessments of the program using time series data, Lee Hansen examined the relative enrollment rates of more and less affluent students before and after the introduction of the Pell program. Hansen's review of the evidence "suggests that expansion of federal financial aid programs and their targeting toward youth from lower-income and lower-status families did not alter to any appreciable degree the composition of postsecondary students or the college enrollment expectations of high school seniors over the 1970s." (Hansen 1984)

[22] Note that these loan limits are set in statute at nominal levels and were only recently adjusted after about two decades at the nominal limit of $2625 for first year students. With the specification of loan limits in nominal terms and substantial increases in college costs during the 1990s, a growing fraction of undergraduate students are clustered at the loan limits, with the share of undergraduate borrowers at the maximum allowable loan levels from the federal program rising from 18% in 1989-90 to 52% in 1999-2000.

[23] Long (2004) notes that these credits are aimed at the middle class, with about 2/3 of the population potentially eligible; those with limited tax liability are ineligible as are those with incomes above a ceiling. The Hope Credit, the first arm of the 1997 tax credit program, provides a tax credit equal to 100 percent of the first $1,000 of qualified tuition expenses and 50 percent of the second $1,000 for the first two years of postsecondary education. The Lifetime Learning Tax Credit, the second arm of the program, covers 20 percent of the first $5,000 in tuition expenditures up to $1,000 and is available for upper level undergraduates, adults upgrading skills or graduate and professional students.

upper income families through the adjustment of institution-specific definitions of expected family contribution.[24] Harvard University's announcement in 2004 that students' families with incomes below $40,000 would no longer make any payments to the cost of attendance was perhaps the most visible, other universities were concurrently increasing financial aid to improve the representation of low-income students. In fact, Princeton University was the first university to eliminate loans from the aid packages of low-income students, initially eliminating loans for low-income students in 1998 and then eliminating loans for all aid-eligible students in 2001. Selective public universities have also launched programs to address the underrepresentation of low-income students in their classes. The University of North Carolina introduced the Carolina Covenant program in 2003 while the University of Virginia put forward an aggressive plan known as "AccessUVa" early in 2004. These initiatives aim to increase public information, recruiting and need-based financial aid. In the fall of 2004, representatives of the admission office at the University of Virginia engaged in unprecedented efforts to reach low-income students and encourage applications. Nearly all of the initiatives emphasize transparency in allocation of financial aid. The architects of these programs have been explicit in trying to frame expected college costs in "plain language" rather than in the jargon of financial aid administrators with terms like "adjusted gross income" and "expected family contribution."

Within the last year, competition among elite private universities has shifted to providing need-based financial aid to students from more modest financial circumstances, engaging in what some might call a "financial-aid bidding war" (Leonhardt, 2008). In December of 2007, Harvard University announced that it would fully eliminate loans, ask families with incomes between $120,000 and $180,000 to pay no more than 10 percent of their income; Yale University quickly followed with a similar plan.[25] A very telling analysis of expected college costs for families of different income levels at different selective private and public institutions is provided by the Project on Student Debt (2008) which shows how for moderate income families (e.g., incomes between $80,000 and $120,000) new aid initiatives may push the net cost of attending a selective private well below the cost of the state flagship university. Yet, because the pool of students easily identified by universities as high achieving and low income remains very limited, it is not clear whether this rise in competition for low-income students has increased the pool of applicants or simply redistributed about the same number among the top-tier institutions.

The decentralized system for the allocation of financial aid in the US does not guarantee that students will have all need met (either through grants or loans), as it is quite possible that the sum

[24] Facing increased public scrutiny, many leaders in higher education have been outspoken in their determination to improve the representation of students from low-income families in selective higher education. Most prominently, then Harvard President Lawrence Summers delivered an address at a February 2004 meeting of the American Council on Education in which he described the "manifest inadequacy of higher education's current contribution to equality of opportunity in America" and went on to announce the new Harvard Financial Aid Initiative designed to encourage the enrollment of students from low and moderate income families.

[25] A number of commentators have noted that such policies may have very unequal effects on institutions and students. Because only a handful of exceedingly high-endowment institutions can afford to compete with these new aid policies, the result may be greater stratification, increased pressure on students to gain admission to a few very wealthy institutions, and greater pressure on some less affluent institutions to offer merit-based aid to compete for high-achievement students.

of the Pell grant, Stafford loan and whatever aid is available from the institution may be less than total need in many circumstances. While it is common see questions of the form "Do credit constraints limit collegiate attainment for low-income?", the form of the question misses the central point that the net price a student will be expected to pay depends on college choice. Very high achieving low-income students can expect quite generous financial aid at the most resource-intensive colleges and universities. Yet, there are surely students who are constrained in their college choices because they are unable to resolve the problem of credit constraints in higher education to pay tuition, fees and living expenses through grants and available loans.

Financial Aid in the UK

Prior to the early 1990s, financial aid for higher education was limited to relatively modest maintenance grants provided to low-income students to cover cost of living expenses.[26] Recognizing the somewhat eroded value of the basic maintenance grants and the need to provide greater access to capital to help students to fund their expenses while studying, the UK introduced a student loan scheme in 1990. The original formulation was means tested, with capital provided in a mixed loan-grant formulation and repayments only to commence when students earnings surpassed a baseline level. The loans under this program were conventional, with fixed repayment amounts, and the full loan value carried by the Student Loans Company, a government agency which was not allowed to increase capital by selling these loans to the private market.

A substantial shift occurred in 1998 with the introduction of fees, the elimination of maintenance grants and the shift from conventional mortgage style loans to income contingent loans. Low income students were exempt from paying the basic £1,000 fee (or, equivalently, received a grant of this amount). In addition, a new program of maintenance loans, structured on an income contingent basis, was made available to all students, with repayment beginning when student income surpassed £10,000.

The Higher Education Act of 2004 not only changed the fee structure, providing institutions with the latitude to charge additional tuition, but also emphasized more general programs to use financial aid to extend higher education to less advantaged students (Wyness, 2007). The act established a new national grant of up to £1,000 per year for students from low-income backgrounds, with students whose households earn £10,000 or less annually receiving the full award and partial awards available to those whose families earn up to £20,000 a year. Government payment in full of the £1,100 standard fee for students whose households earn up to £20,000 annually continued, as well as partial payment for those whose household incomes fall between

[26] In the late 1970s and into the 1980s, it appears that UK students experienced quite generous levels of support as they were also eligible for more general social services and income maintenance programs while enrolled in college. Blanden and Machin (2004) note that many students received a means-tested maintenance grant to cover living costs and the basic fees were paid by the local education authorities. Blanden and Machin go on to note "In addition, students could also make use of the social security system, receiving housing benefit to help with the cost of living off campus and unemployment benefits during vacations." These benefits were eroded in the 1980s.

£20,000 and £30,000. Both provisions were eventually replaced in 2006 with a £2,700 maintenance grant for students whose households earn £17,500 or less annually, with partial awards going to students with annual household incomes of £17,501-£37,425. The act also retained a maximum £3,905 student loan (£4,625 for 2008-09) for living expenses available to persons from households earning less than £10,000 per year. In addition, the act provided the option for students from all income backgrounds to defer payment of all tuition and fees until after graduation, with loan repayment occurring in an income contingent form through the tax system at a rate of 9% of annual income.

As institutions chose to charge additional fees, they also introduced explicit provisions to increase institutional financial aid or bursaries for low-income students, with the newly-created Office for Fair Access monitoring the additional bursary offerings and the change in the representation of low-income students.[27] In this sense, universities in the UK began to look more like US institutions in their pricing strategies with students facing a net price of a university education that is increasing in income.

In comparing the availability of financial aid in the US and the UK, the most obvious question concerns the extent to which students in either country are credit constrained, such that insufficient access to capital limits college choice or collegiate attainment, producing a clear source of inefficiency. While in the US there are widespread accounts of students with "too much" debt,[28] the loan limits in federal programs in the US and the UK may nevertheless limit the extent to which student have sufficient access to capital markets. The income contingent program adopted in the UK resolves the problem that individuals have in diversifying the risk of investments in human capital by linking repayment with future income. At the same time, income contingent programs necessarily involve a greater government subsidy, in addition to some incentives for moral hazard. It will be some time before a full evaluation of the tradeoffs associated with differentially structured loan programs is possible.

[27] However, in the initial years it appears that a number of universities set aside more resources from the additional tuition revenues than they were able to distribute in need-based grants, leading to questions about the extent to which students knew about the aid and whether the aid would affect enrollment choices (Times Higher Education Supplement, 2008).

[28] A series of popular books including *Strapped: Why America's 20- and 30-Somethings Can't Get Ahead* (Tamara Draut, 2006) and Generation Debt: Why now is a Terrible Time to Be Young (Anya Kamenetz, 2006) suggest that student debt is among the primary barriers to economic stability faced by young people.

4. Matching Students and Colleges

Beyond the (persistent) concerns about college financing, there is evidence that conditional on observed secondary achievement students from low-income families negotiate the process of college selection much differently than their high income peers in both the US and the UK Indicators of these income-based gaps include consideration of different types of colleges and application to fewer colleges. The process and mechanism of college application and admission may serve to widen rather than narrow socio-economic differences at the secondary level. This section proceeds with a brief review of the application and admission process in the US and the UK.

In application and admission, there is a sharp contrast between the relative decentralization of the US market and the centralization of the application mechanism in the UK Despite structural differences, the length and complexity of the process is common in both the US and the UK, with the formal cycle taking nearly a year from beginning to end and much longer when course selection at the secondary level is seen as an input to college admission and selection. Indeed, the long chain of decisions includes students deciding the schools or programs to which applications will be submitted, institutions in turn making decisions of admission and students then making choices about where to matriculate. More applications may yield more choices and students with more information about the quality of the match with any particular school and the likelihood of admission may be able to make better application choices.[29] Beyond the obvious points of academic preparation, the college application process is a complicated decision because choosing among institutions (or programs in the UK) relies on expectations of the probability of admission, the correlation of admission decisions and the student's expected utility of any collegiate outcome; uncertainty about these values is likely greater for low-income students and other groups lacking information about the collegiate application and admission process (Pallais, 2008).

Application and Admission in the United States

Reflecting the overall diversity in the market for higher education, the process of college admission and matriculation in the US is highly decentralized with criteria and timing varying widely across types of institutions. At one extreme many community colleges and some four-year institutions are open access: students must simply meet basic statutory requirements for admission. At the other extreme, many private and some public institutions maintain competitive and selective admissions, as high selectivity is regarded as an indicator of college quality. At the top tier institutions, criteria for admission are far from transparent with institutions weighing a portfolio of student attributes – test scores, extracurricular activities, high school grades, strength of schedule and in some circumstances race and family economic circumstances. Emphasizing the

[29] Choosing where to apply to college is a difficult problem in both theory and practice; Pallais (2008) notes that 4,100 colleges in the US implies 2^{4100}-1 potential college combinations. Experienced guidance counsellors typically recommend that students apply to a portfolio of colleges that include "Reach", "Possible" and "Safety" schools, where the students are respectively unlikely, plausible, and almost certain candidates for admission.

holistic nature of the admission objective, strict grade and test score cutoffs are discouraged and, indeed, most empirical analyses of the admission process make clear that while the probability of admission is increasing with test scores and grades, there is a substantial range over which the probabilities are greater than zero and less than one.[30]

The formal process of college application begins in the junior year of high school when students sit for the SAT and ACT examinations. With knowledge of standardized test achievement, high school grades and extracurricular participation, students make application decisions in the fall of the senior year of high school. In the main, students apply to a college or university not a specific program, though there is some distinction between admission to engineering schools and liberal arts programs at research universities; as discussed below, this is a contrast to the UK where program application is more specific. The application process in the US may lead to some further stratification in outcomes by family background through direct preparation (e.g., high income students may invest more in preparation for the collegiate achievement tests and / or may take these exams more frequently)[31] or through the application strategies employed, to the extent that students from more affluent high schools have more information about prospects for admission at particular schools.

Students apply separately to each school, providing some common information such as achievement test scores and high school grades to all schools and then also completing institution-specific essays or questionnaires. Academic applications are also followed with applications for financial aid in January of the senior year, which include the federal FAFSA form and a separate CSS application which is used by colleges and universities granting considerable financial aid from university resources.

One distinctive institutional feature of US higher education is the presence of "early decision" and "early action" programs at selective colleges and universities; in the case of the former, students must make a commitment to enroll if accepted through an early review process and in the latter students are simply notified early of their admission.[32] Colleges and universities find benefits in the early admission programs because they provide signals of student interest and allow for more certainty in planning, while students may find strategic advantage in applying early to the extent that institutions reward early applicants with somewhat greater probability of admission (Avery, Fairbanks and Zeckhauser, 2003). Yet, the benefits of early decision programs may accrue disproportionately to students who are well-informed about the college admissions strategies and those for whom competition among schools for financial aid is less important.

[30] Bowen and Bok (1998) show the probability of admission to five selective colleges and universities by race (Figure 2.5) and it is clear from this analysis that even for students with perfect SAT scores that probability of admission is appreciably less than 100%.

[31] Indeed, there is considerable evidence based on the growth of independent college advisors (some charging as much as $30,000 for full consultation on application preparation) that relatively wealthy parents are willing to spend considerable sums to help their children prepare college applications and negotiate the college choice process. One article suggests that nearly 22% of freshman at private four-year colleges employed independent counsellors (*Business Week,* 2006).

[32] A further permutation is the presence of "single choice" early action programs which provide students early notification while mandating application to only one school prior to the regular admission cycle commencing in January.

The institutional structure of college application and admissions in the US is explicitly competitive – with students competing for admission and colleges and universities competing to lure the most talented students. Yet, as has been noted, the nature of this competition benefits students from families with considerable knowledge of how the game works, with these students often disproportionately from relatively affluent families or those with parents who are also college graduates.

There is clear empirical evidence of substantial differences in application behavior by family background in the US Spies (2001) finds that among high-scoring students, those from low-income families are about 18 percentage points less likely to apply to one or more highly selective schools.[33] Among students at Boston high schools differing dramatically in socio-economic circumstances, Avery and Kane (2004) find that students from more affluent schools are more likely to apply to a four-year college than are students attending disadvantaged high schools, even when observable student achievement differences are taken into consideration. Using score sending behavior as a proxy for applications, Pallais and Turner (2006) find that low-income students are appreciably less likely than their more affluent peers to send standardized test scores to top private universities and top liberal arts colleges; in addition, these students these students tend to be less likely to send scores to public flagship university, with the exception of students in California. Recent analysis in Pallais (2008) makes clear that score that relatively high income students send more scores and send scores to somewhat higher quality (as measured by test scores of matriculating students) than their low-income counterparts. Differences in college application behavior affect college choice to the extent that more applications generate more choices after admission decisions.

In their study of the application process of high school students in Chicago, Roderick and co-authors (2008) articulate the two types of tasks that students must effectively complete to enroll in a suitable four year college:

> "First, they must take a series of basic steps for four-year college enrollment: they must submit applications on time, apply for financial aid, gain acceptance, and ultimately enroll. Second, throughout this process, beyond hitting the benchmarks, students must be fully engaged in the often overwhelming task of finding the right college for them." (p. 2)

In examining the behavior of graduates of the Chicago Public Schools, with disproportionate representation among low-income and minority students, Roderick and co-authors (2008) find that only 41% of high school seniors aspiring to complete a four-year degree as high school seniors actually complete applications to four-year schools. Social capital explanations may explain some of the "slippage" in this process to the extent that there is no strong support system either in families or in high schools with strong knowledge about the norms of applying to college along

[33] This reference group includes the private colleges and universities that are members of COFHE (the Consortium on Financing Higher Education).

with concrete guidance and encouragement throughout the process. Failure to complete multiple applications to four-year schools or to complete the FAFSA form often leave the low-income students enrolling in community colleges even as they have the qualifications to attend four-year institutions with greater selectivity, more resources per student and greater success in producing college graduates. The result of this breakdown in the application process is that many low-income students who have the qualifications to attend top-tier institutions are mismatched. Coding student capacity in relation to university options as "very selective", "selective", "somewhat selective", "nonselective four-year" and "two year", Roderick et al. (2008) find that only 38% of the students with the achievement to attend a "very selective" institution were matched with this type of institution while only 27% of students with the achievement to attend a "selective" institution were able to hit this category or above.

One further result from the US on the application and admission process is that there is considerable variation by high school in how students negotiate the application and college choice process (Roderick et . al., 2008; Pallais, 2008; Avery, Hoxby et. al.; 2006). Roderick et. al. (2008) estimate the difference in the likelihood of in a multivariate context and find that attending a school with a strong culture of college going (measured by the percentage of prior graduates who applied to three or more schools) raised the likelihood of matching with a college appropriate to achievement by about 20 percentage points. Such results are consistent with work by Avery, Hoxby et. al. (2006) who show that the qualified applicants who do not apply to the most elite institutions are likely to come from high schools that have little or no tradition of sending applications to selective private colleges and, as such "targeted outreach to such 'one offs' – that is, students who are one of only a few qualified students from their school in recent years – may be a way for selective private colleges to increase their income diversity."

Application and Admission in the UK

In the UK, the application process is appreciably more centralized than in the US, with the Universities and Colleges Admissions Service (UCAS) playing a central role in transferring materials from students to programs at universities. Applying through this central clearinghouse in the fall of the year of A-level exams, students in England choose programs within institutions (akin to applying to a department in the United States).[34] Students are limited to five applications (with some variation) and are restricted to applying to either Cambridge or Oxford (not both). What is particularly cumbersome about the system is that most students make application decisions in advance of their results on the A-level examinations. Teachers, in turn, provide estimates of A-level performance which are then used to generate conditional offers of admission.

[34] In Scotland, students are typically admitted to the broader unit of a faculty or a university at large. As such, Scottish students tend to choose their area of specialization later in their undergraduate coursework than their counterparts in England and are often required to take a broader range of courses. Malamud (2007) exploits the difference between the English and Scottish arrangements and finds that relatively late specialization is tied to relatively fewer early career occupational switches which is consistent with the idea that the learning occurring in the system allowing later specialization may lead to improved match quality.

Suffice it to say students face considerable uncertainty in this process and those best able to navigate this system will likely have benefited from considerable strategic advice. Research commissioned by UCAS showed that predicted grades are accurate for 45 per cent of applicants. Just over half (51 per cent) of pupils from the highest socio-economic group receive accurately predicted grades compared with 39 per cent in the lowest socio-economic group (Sutton Trust, 2008, p. 40).[35]

The distinct early specialization in the UK system has students selecting A-level subjects at the secondary level, effectively narrowing the likely range of potential university programs well before actual university application. There is some evidence that students at the least advantaged state schools are not given appropriate guidance on the A-level subjects advisable for entrance to a leading research university (Sutton Trust, 2008). To this end, the Director General of the Russell Group noted, "Clearly if pupils from certain state schools are increasingly taking a combination of subjects which put them at a disadvantage in competing for a course at a Russell Group university, the task of widening participation in our universities becomes even more difficult."[36] One result of differential guidance on A-level selection is that it is all the more difficult to distinguish deficiencies in achievement from differences related to course selection and guidance at the application stage.

How students from different secondary school types and family backgrounds negotiate the university application process is an important dimension of the college matching process. A report from the Sutton Trust (2008) notes: "A major factor driving differences in admissions to highly selective universities between independent and state schools with similar attainment is the likelihood of making applications to these universities in the first place." (p. 39). Further analysis on the extent to which the number of university applications and the type of programs selected by students vary by socio-economic circumstances is clearly important for understanding the extent to which guidance at the application stage could be a significant tool in improving university matches.

Beyond students' application choices, recent policy discussions have turned an eye to the question of whether low-income students are penalized or advantaged in the admission process at selective universities. In the US, the answer appears to be neither: conditional on academic achievement, low-income students are admitted at about the same rate as their more affluent peers (Bowen, Kurzweil, Tobin, 2005). In the UK, there is perhaps some question about whether the advantages of independent school participation are further multiplied at the time of admission beyond A-level

[35] There has been at least some discussion already about the potential costs and benefits to a post-qualification applications system, as such a system receives strong support among the teaching profession. To be sure, the implications in a static model are ambiguous with respect to the effect of a post-qualification system on existing A-level students from low socio-economic circumstances – improving prospects for those under-predicted, but lowering them for those over-predicted. Yet, because low socio-economic students tend to have greater uncertainty in A-level results, it may be that a shift to a post-qualification application system would aid these students by helping them to make stronger application choices.

[36] http://www.russellgroup.ac.uk/news/2008/statement-on-a-level-choices-following-sunday-times-article-of-6-january-2008.html

performance (Sutton Trust, 2008).[37] Whether universities should "put a thumb on the scale", in the words of Bill Bowen, to offer a modest preference in admission to those who have been disadvantaged by family circumstances and secondary school characteristics is a serious policy question for future discussion.

5. Policy Considerations and the Collegiate Attainment Gap

In the main, the research and policy literature on the underrepresentation of low-income students in higher education has focused, first, on the margin of college enrollment (often called "access") as the primary outcome and, secondly, considered the primary explanatory factors to be tied to achievement gaps and credit constraints. The resulting policy discussion then turns to consideration of whether increasing financial aid or investing in early stages of the educational pipeline will yield the highest return.[38]

A central argument of this paper is that the most economically significant margin of underrepresentation of low-income students in the US and, to some extent in the UK, occurs at the margin of college choice, not enrollment. The concentration of students from low-income families at the least resource-intensive universities may exacerbate intergenerational inequalities. To be sure, achievement gaps related to family circumstances and neighborhood characteristics apparent at the end of the secondary school years are sizeable in both the US and the UK and are closely coupled with the observed distribution of students among colleges.

Nevertheless, relatively high achieving low-income students appear appreciably more likely than their more affluent peers to "mismatch" in initial college selection and, particularly in the UK, fail to pursue postsecondary education. The process of college choice, particularly when considering specialized and selective institutions in the US and the UK, is exceedingly complicated and there a number of ways that limited information may further impede low-income students. More significantly, university options depend critically on choices and preparation during secondary years; in the UK A-level subject selection and performance is an explicit barrier to university applications.

[37] The Sutton Trust report "University Admissions by Individual Schools" notes that about a third more pupils are admitted to the top-tier universities than would be expected given the schools' average A-level results. Without access to micro data on student performance, combined with the dimensions of applications that are not captured in the quantitative scores, it is hard to evaluate fully this claim.

[38] From one perspective, Nobel laureate James Heckman writes: "If our aim is to encourage college attendance, improving the environments of children and improving preparation for college will be more effective than grant or loan programs to economically or cognitively children in their late teenage years…. By the time individuals finish high school, scholastic ability is determined, and tuition policy will have little effect on college attendance." (p. 96)

Credit constraints remain a theoretically plausible deterrent to the enrollment and persistence of low-income students in higher education, though empirical evidence remains limited. One fallacy that merits correction in all contexts is that zero or low-tuition eliminates credit constraints. Neither the British experience with zero tuition nor the US experience with low tuition at public colleges have eliminated attainment deficits for low-income students as living expenses may continue impose a serious hurdle to financing an investment in education. At the same time, proving that insufficient access to capital markets is the primary deterrent to college enrollment or college choice is more difficult. In both the US and the UK, it would appear that many students do not fully avail themselves of all opportunities to borrow for college. Aversion to debt may well be as big of a barrier to enrollment and persistence as the absence of credit market institutions to finance higher education.

Perhaps more significantly, it seems likely – particularly in the US where differences in college costs may be large – that credit constraints play a larger role in limiting college choice rather than affecting enrollment *per se.* Improved knowledge of credit markets combined with greater access to student aid (particularly loans) would go some distance to addressing this market failure.

To be sure, capacity to finance college is important to attainment in the US and the UK. Yet, while the availability of financial aid is a necessary condition for improving access and success of low-income students, it is not a sufficient condition. There is no question that policies to reduce the achievement gap in the secondary years associated with family circumstances would do much to reduce gaps in collegiate attainment. In the main, such policies fall in the purview of policymakers with control of resources in the early stages of the educational pipeline. For college and university leaders, the salient question concerns how to increase the pool of low-income students well-prepared to succeed in college. Two margins merit particular attention:[39]

i) identifying and recruiting students who already have the academic preparation to attend universities, but may not pursue broad application strategies, misperceive the net cost of attendance, or underestimate the probability of admission; and
ii) investing in efforts to enlarge the pool of students prepared to succeed at the university level by providing extra-curricular programs at the secondary level to improve college preparation (e.g., advising on course selection and test preparation).

Some of the specific points of potential intervention include:

- Greater simplicity and transparency in the application process;
- Information to address potential misperceptions of net costs on the part of students and parents;
- Identification of students earlier in the secondary process and communication of requirements for success at the university level;

[39] In highlighting these two margins, it is worth emphasizing that the programming and support that occurs during the years of college attainment should not be ignored; yet, such policies operate primarily at the level of the institution, though there are surely gains to some collaboration on the consideration of effective strategies.

- Better guidance about college pricing and financial aid to help to students understand net price and the potential costs and benefits of student loans;
- Targeting of financial aid and other programmatic interventions.

These recommendations are quite broad and, in considering applications to the US and the UK, recognition of the distinct features of the institutional landscape bridging secondary education and university education is imperative. In the UK, there is a notable widening of socio-economic differences in outcomes between the GCSE examinations and A-level participation which necessarily limits enrollment options for the most economically disadvantaged students. In the US, where college-application is general rather than program-specific, differences by socio-economic status for high-achieving students are most clearly manifested in the process of college application and college choice. Cross-country differences in the structure of secondary education, testing regimes and the college application process necessitate somewhat different policy approaches. Nevertheless, comparative analysis and discussion provides a constructive template for understanding opportunities for the development of policies to reduce the considerable differences in college and university attainment by family circumstances.

There is much promise – and, perhaps, a bit of peril – that comes from the recent attention from policy makers and leaders of colleges and universities to the underrepresentation of students from low-income families in higher education.[40] Enthusiasm and determination for the objective should not obscure the real difficulty and complexity of the problem. As such, it is imperative to bring the best social science to the questions of how to increase the participation of low-income students in higher education. It is not sufficient for policy makers or university leaders to provide support well-intentioned and thoughtful attempts to help students from all backgrounds succeed in higher education; evaluation is imperative.

Finally, it is important to keep in focus the observation that college education is offered after a long chain of prior investments from early childhood education to elementary and secondary programs as well as investments in the family. It is neither possible nor efficient for colleges and universities to eliminate fully the entrenched inequalities apparent at the time of college entry. Yet, given the extensive public support for higher education in both the US and the UK, it is incumbent on leaders in higher education and public policy to ensure that colleges and universities provide genuine equality of opportunity and serve as a visible symbol of intergenerational mobility.

[40] In writing this, I am reminded of statement made by Bill Bowen more than forty years ago: "As more money is spent on education, the old undocumented assertions that "we know" or "we believe" that "education pays," will prove less and less satisfactory to the private and public groups that have to pay the mounting bills. Surely the issue is not whether attempts should be made to apply the techniques of economic analysis to education, but how to best do so." (Bowen, 1964)

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State Intervention in Higher Education

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In both the US and the UK, children from poor backgrounds remain far less likely to go to university than more advantaged children, as set out in Sarah Turner's paper. Inequality of access to HE, at least for socio-economically disadvantaged students, actually worsened in the UK during the 1980s and early 1990s (Blanden and Machin, 2004; Galindo-Rueda et al. 2004, Machin and Vignoles, 2004). The big policy questions are of course: why? and how can the state intervene effectively to reduce inter-generational inequality, in terms of access to higher education?

The evidence from the US appears quite stark. Much of the literature has focused on the role of parental characteristics specifically – including income, ethnicity, education and socio-economic status – in determining young people's likelihood of attending HE (Blanden and Gregg, 2004; Carneiro and Heckman, 2002 and 2003; Gayle et al. 2002; Meghir and Palme, 2005; Haveman and Wolfe, 1995). Such studies have generally found that an individual's probability of participating in higher education is significantly determined by their parents' characteristics, particularly their parents' education level and/or socio-economic status[1]. This literature also suggests that gaps in educational achievement emerge early in pre-school and primary school (Cunha and Heckman, 2007; Demack et al., 2000) and that by contrast potential barriers at the point of entry into HE, such as low parental income, do not play a large role in determining HE participation (Cunha et al. 2006). This view is contested however, and a recent paper by Belley and Lochner (2008) suggests that in the US, credit constraints have started to play a potentially more important role in determining higher education participation.

The UK context is of course quite different. The fees paid by students are considerably lower than US students and means tested student support (in the form of grants) has been re-introduced in the UK. Nonetheless the same questions arise. When does the gap in educational achievement between poor and rich children emerge? Does it widen at point of entry into HE?

We have an ESRC-TLRP research project *Widening Participation in Higher Education: A Quantitative Analysis,* which addresses just these questions for the UK. The project has produced a quantitative analysis of who goes to HE and who does not, as well as an analysis of the type of HE experienced by different pupils and their HE outcomes. The purpose of the work was to understand whether individuals from poorer backgrounds are indeed less likely to attend HE once you allow for their prior achievement, particularly A level grades. If the disparities in HE participation between socio-economic groups are small once A level scores are taken into account, this would suggest that education inequalities prior to higher education, in the school system itself, are at the root of the socio-economic gap in HE participation.

We used a new combination of large scale, individual-level administrative datasets that have been linked by the Department for Children, Schools and Families and the Department for Innovation, Universities and Skills. This includes data from the National Pupil Database and Pupil Level

[1] There is another literature which has focused on the difficulties in identifying the distinct effects of family and school environmental factors and the pupil's genetic ability. There is growing recognition that gene-environment interactions are such that attempting to isolate the separate effects of genetic and environmental factors is fruitless (Rutter et al. 2006). See also Cunha and Heckman (2007) for an overview of this area of research.

Annual School Census, i.e. administrative data from the school system and Higher Education Statistics Agency data on those who participate in HE. The data therefore contain information on the personal characteristics of all pupils (including ethnicity, free-school meal status[2], birth date, gender), as well as their prior achievement from age 11 onwards. The data follow a particular cohort of children, namely state school students in England who were in Year 11 in 2001/02.

Because these data provide information on every individual in state schools in Year 11 in 2001/02, we can look at the trajectories taken by pupils from poorer socio-economic backgrounds and identify when their relative education achievement falls away. Unlike previous work using HE records alone (e.g. HESA data), our analysis is based both on participants and non-participants, allowing for a more robust analysis.

There are a number of limitations to our data. Firstly, it includes only young entrants to HE, so we cannot analyse mature student enrollment. Secondly, we have imperfect measures of socio-economic deprivation and disadvantage in our data, namely whether the pupil received free school meals and/or indicators of the deprived nature of their neighbourhood. Thirdly, we only analyse the socio-economic gap in HE enrollment for state school students. To the extent that private school students tend to be rich and high achieving, we may understate the size of the socio-economic gap.

We find a number of striking results. Firstly, once we allow for prior achievement, poorer and richer students have similar HE participation rates. In other words, the massive socio-economic gap in HE participation is attributable to differences in the education achievement of children much earlier in the education system, rather than at the point of entry into HE. Our second finding is that those disadvantaged pupils who do improve in secondary are more or less as likely to participate in HE as their richer counterparts. Whilst we do not suggest that were we to improve the performance of *all* disadvantaged pupils that they would all participate in HE to the same extent as their richer counterparts, this finding is encouraging. If policy could improve the prior educational achievement of disadvantaged students, they may participate in HE as much their richer counterparts.

We also examined the types of institutions attended by poor and rich students. Unsurprisingly, and in line with previous Sutton Trust work, a strong socio-economic gradient exists in the status of university attended. Small socio-economic differences in the likelihood of attending a higher status university HE remained even when we allowed for prior achievement. This gap would be larger if we had private school children included in the sample.

Access to higher status institutions also varies by ethnicity. For a given level of prior achievement, Black-Caribbean, Bangladeshi and Other Black students tend to access less prestigious institutions than white students. Equally, Chinese, Other Asian and Mixed ethnicity students tend to access more prestigious institutions than whites.

[2] This can be thought of as a proxy for low family income.

Given these patterns, what type of state intervention are likely to be effective? Our evidence is consistent with the view that intervention needs to be early and needs to tackle low achievement in schools. The implication is that if differences in educational achievement emerge early then policies that only target interventions at the point of entry into HE (e.g. bursaries) are not likely on their own to produce large increases in HE participation amongst poorer students. By contrast policies that are targeted earlier in the system may be more effective. For example, attempts to raise standards in schools, particularly for poorer children, and the provision of better advice and guidance for poorer students may be far more effective. Clearly it is critical that if educational inequalities emerge so early in the education system (certainly by age 11), we need to ensure that we do what we can to raise children's expectations about participating in HE from a very early age.

That said, the real culprit behind the lower participation rates of disadvantaged pupils is their low level of achievement: this much is clear from our research. Poorer pupils have low achievement for a number of different reasons, not least that they attend lower quality schools. Therefore policies that address issues of secondary school access i.e. that determine who gets into "good" schools, are likely to be as important as policies aimed at improving HE access. How to ensure effective access to good schools for poorer students is a difficult question. Solutions range from lotteries (so that attendance at a good school is no longer linked to your post code, and by implication your ability to purchase a particular house), through to re-introduction of widespread academic selection (in an attempt to introduce selection by ability rather than parental background). Both approaches are politically difficult and the evidence base is not clear enough as to the effectiveness of either. another option might be to re-introduce a form of selection within schools, for example by introducing Gifted and Talented schemes that run across a number of different schools and that thereby ensure that the most talented pupils (regardless of family background) access a high quality and appropriate programme.

Of course in an ideal world we would raise standards in schools so that all schools become "good". There is a huge literature on raising standards in schools but one relatively straightforward starting point is to introduce clear incentives for school to focus on the extent to which they get their students (particularly their poorer students) into HE. Thus including HE participation rates in secondary school league tables by type of university attended and degree subject may well be useful in this regard, although we must be mindful that this does provide yet another incentive for schools to admit higher achieving pupils (generally from more advantaged backgrounds) at the expense of the less able.

Another area that calls for more effective state intervention is in advice and guidance, which is still patchy according to research carried out by the Sutton Trust. Advice needs to focus not just on enabling students to participate in HE but also focusing on the type of institution a student is best suited for, with the emphasis on raising the aspirations of poorer students. For advice and guidance to be more effective, clearly there needs to be better accountability in the system. It is not sufficient that advice and guidance is undertaken by a teacher in their "spare" time. Rather if HE participation rates are included in school league tables, schools are likely to have improved and

dedicated resources allocated on assisting their students to make the transition into HE. Simplification of admissions to university, with perhaps just one admission test, would also help with this.

Last, but by no means least, we have to raise expectations. Work by the Sutton Trust suggests that students already have high aspirations about higher education. It is equally important perhaps that their parents and teachers have high expectations. Only then will poorer pupils get the right kind of encouragement, advice and guidance. There are a range of state interventions that would seem to move in the right direction on this including:

- Aimhigher
- Summer schools
- Residential programmes and mentoring
- Publicity about the value of HE

What is perhaps lacking however, are family based approaches targeted on specific individuals in sufficient time for them to raise their aspirations, expectations and attainment well before it becomes time for them to decide whether or not they want to go to university.

It will not have escaped the reader's notice that whilst our understanding of when educational inequality emerges is grounded in robust evidence, the notion of "what works" is less evidence based. It is still very much the case that we need to properly evaluate all state interventions that are designed to raise the aspirations and achievement of poorer children and improve their chances of accessing high quality higher education. Only then will we be in a position to say with conviction "what works".

Furthermore, we need to have a clearer view on kind of HE that we expect to have in the UK. One way to widen participation to disadvantaged pupils is to put the onus for action on universities, who may well respond with lower admission standards to meet widening participation targets. This is not what we want to achieve. We want to widen participation to high quality HE and perhaps the better way to do that is to shift the onus more clearly on to schools (e.g. in the form of making schools accountable for HE participation rates). This latter approach is more likely to widen participation whilst keeping standards and achievement high.

Observations on the Social Mobility of the Children of Immigrants in the United States and United Kingdom

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1. Introduction

Definitions

- First generation immigrants – foreign-born persons who have immigrated to the US or UK and did not have US or UK citizenship at birth.
- Second generation immigrants – those *born in the US and UK* to at least one parent who is foreign-born (i.e. is a first generation immigrant).
- Children of immigrants – (also described as children in immigrant families) are those with at least one foreign-born parent. This group includes both foreign-born children under 18 and those born in the US and UK.
- Non-immigrant peers – (this includes the third and higher generations) are those born in the US or UK whose two parents were also born in the US or UK. Also referred to as children of native-born parents.

The United States and the United Kingdom are both high-immigration nations. The foreign-born make up a significant group in both countries: one in eight in the US and one in ten in the UK. The numbers of children of immigrants are larger still, and is estimated at 24 percent of young children (age five and under) in the US, and 25 percent (using a different metric) in England and Wales.[1] In some areas, such as Los Angeles, New York or London, the proportions are much higher. Individuals with an immigrant background, therefore, are set to form a significant proportion of US and UK populations for decades to come. This means that any strategy to promote social mobility needs to consider immigrants and their children.

Social mobility is not a neatly defined concept, but it is one that is widely recognized as highly important. In the words of the historian C. L. R. James "it is not quality of goods and utility that matter, but movement; not where you are or what you have, but where you come from, where you are going, and the rate at which you are getting there" (James, 1963). The UK Strategy Unit defines social mobility as having two core aspects: giving individuals access to "jobs in line with their potential" and providing "better jobs for each successive generation" (Strategy Unit 2008). We use this definition for the purposes of our discussion.

In the context of immigration, therefore, the two core questions are: do first-generation immigrants access the jobs of which they are capable; and do their children have better opportunities than their parents (and the same opportunities as their non-immigrant peers)? In

[1] Data for the US are from the 2005-2007 American Community Survey (ACS) three year estimates. Data for the UK is calculated from birth data for 2002 to 2007. Note that these datapoints are not directly comparable. The UK data is likely to be an overestimate since some of these children will have moved away from the UK.

this paper, we discuss how immigrants and their children are faring according to these criteria, and what policies should be considered to improve their social mobility. While our focus is on wages and employment, we bring in other labor market and human capital indicators as appropriate.

This discussion must be situated within the wider debate about social mobility in the US and the UK. Contrary to the self-perception of both countries' societies, upward mobility among the populations of the US and UK is rather limited. Both countries rank surprisingly low in international comparisons (Blanden et al 2005; OECD 2007). For example, Anna Cristina d'Addio's review of the evidence highlights that of 12 OECD countries considered, the UK ranked highest in the persistence of income across generations, and the US placed third (OECD 2007, p 33). This has given rise to renewed political and academic interest in the subject. While the academic literature on social mobility remains wider and deeper in the United States, the UK literature has grown significantly since the early 1990s.

This paper focuses on a sub-set of the literature – the social mobility of *immigrants* and their offspring. Again, this literature is more extensive in the US than in the UK, where much of the relevant research addresses ethnicity, rather than immigrant status, making it more difficult to provide a complete picture of how immigrants perform. Moreover, direct comparisons between the UK and the US are difficult because the characteristics of groups that immigrate to the US and UK in large numbers – key determinants of mobility – differ, often radically, as does the policy context. These factors make drawing concrete policy recommendations from an immigration standpoint an exercise in the inexact.

This paper begins with the necessary and very brief background on first and second generation immigrants in the US and the UK. We then discuss the evidence on social mobility among these groups, why it matters and how we can explain the trends observed. Finally, we outline the policy implications (focusing on early education, school age interventions and language policies, as well as potential changes to immigration systems) as well as requirements for further research, including some of the tough, unanswered questions about immigrant social mobility.

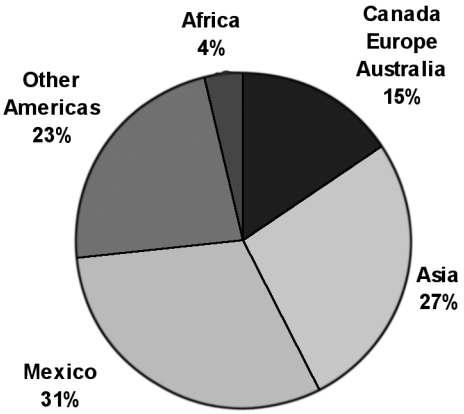
2. A New Demographic Reality

Large and growing numbers of immigrants and children of immigrants requires that the social mobility these two groups be taken seriously by policymakers in the United States and the United Kingdom. In this section we describe the numbers and characteristics of first and second generation immigrants in both countries.

First generation immigrants in the US and the UK

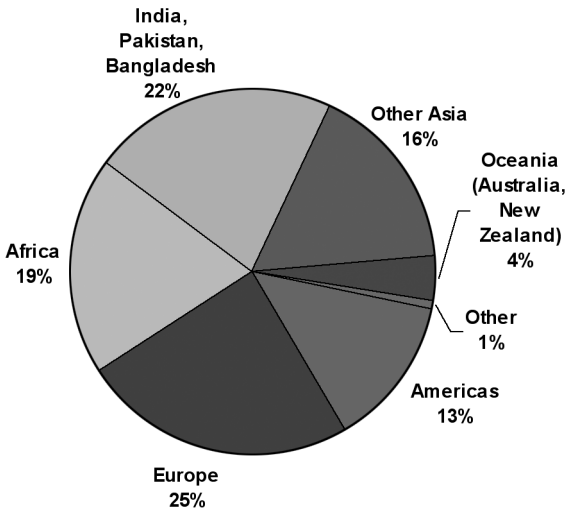
There are more than 38 million first generation immigrants in the United States, and 5.4 million in the United Kingdom, making up one in eight and one in ten of the countries' respective labor

Figure 1: First Generation Immigrants in the United States, 2007



Source: American Community Survey 2007.

Figure 2: First Generation Immigrants in the United Kingdom, 2001



Source: United Kingdom Census 2001

forces. These immigrants come from a range of countries, with substantial differences between the US and UK (See Figures 1 and 2). In particular, the US has much larger proportions from Mexico and the Americas, while the UK has a larger Commonwealth population.

Immigrants' characteristics also vary between the two countries, although a few common trends can be determined. Immigrants to both countries are overrepresented at both the high- and low-skilled ends of the educational spectrum, with fewer at the intermediate skill level. Immigrants tend to be younger, on average, than the native population. They are more concentrated in metropolitan areas than native workers. And they have higher fertility rates – more children per woman.[2]

Currently, immigrants' children[3] also make up a substantial proportion of children in the US and UK. As we will describe, this proportion is set to grow, since second generation immigrants are more strongly represented among younger children. As noted, for children of age five and under, 24 percent are born to immigrant parents in the US and 25 percent in England and Wales.[4] In other words, continued growth in the proportion of second generation immigrants is a mathematical reality.

[2] For more statistics on first-generation immigrants, see Terrazas and Batalova (2008) for the US, and Salt and Millar (2006) for the UK.

[3] In the following sections we refer alternately to the *second generation* and the *children of immigrants,* depending on the availability of data and research. See the definitions in the Introduction for a description of the difference between these two categories.

[3] See Footnote 1, on previous page.

United States: characteristics of the second generation

In the United States, the children of immigrants (defined as those with at least one foreign-born parent) have grown significantly as a group: in 1970, they comprised about 6 percent of children under 18; they now constitute over 20 percent and are projected to reach 25 percent of all children by 2010 (Capps and Fortuny, 2006). In other words, the children of immigrants will soon comprise one in four of all US children. The children of immigrants under the age of 18 are typically US citizens (four of every five) and increasingly Latino or Asian.

If we take all individuals born in the US with at least one foreign-born parent as a whole group, we find they are young, with a median age of 21 years, compared with 38 years for the foreign born population. Their age is a product of the large, recent wave of immigrants to the United States. We also find more than two out of five of the second generation has a US citizen for one of their parents. A significant proportion of the second generation, 29 percent or over nine million persons, originates from just one country: Mexico (Dixon, 2006).

Table 1 illustrates the breakdown by region and country of origin and shows the change in the composition of the second generation over time. In particular, the second generation with origins in Mexico and "Other America" totalled 28.5 and 15.5 percent respectively of the total proportion of all second generation immigrants in 2004, compared to just 6.9 and 2.3 percent in 1970. In a

Table 1: United States Weighted Percent of First and Second Generation by Origin, 1970 to 2004

	1970	1979	1990	2000	2004
First Generation					
Canada/Europe/Australia	68.8	48.7	33.2	20.2	17.1
Asia	9.1	21.2	23.2	26.3	28.9
Mexico	9.7	15.2	24.8	27.9	28.8
Other Americas	11.4	13.6	17.4	23.3	22.8
Africa	1.1	1.2	1.5	2.4	2.4
Total	100.0	100.0	100.0	100.0	100.0
Second Generation					
Canada/Europe/Australia	87.8	81.3	32.9	43.4	34.9
Asia	2.8	4.3	23.6	15.1	19.4
Mexico	6.9	10.2	25.5	26.1	28.5
Other Americas	2.3	3.9	16.8	14.2	15.5
Africa	0.3	0.3	1.2	1.2	1.7
Total	100.0	100.0	100.0	100.0	100.0

Sources: 1970 IPUMS; 1979 November CPS; 1989 November CPS; 1997-2003 March CPS; 2004 March CPS – table cited in Waldinger and Reichl (2007); American Community Survey 2007.

corresponding proportional drop, second generation immigrants with origins in Canada, Europe and Australia decreased from 87.8 percent in 1970 to 34.9 percent in 2004.

Discussions of US policy have recently tended to focus on the "new" second generation. These are immigrants who arrived after 1960, which essentially discounts the older second generation, predominantly of European (or Australian and Canadian) heritage. Data from the Current Population Survey (CPS) indicate that the "new" second generation totals over 30 million people (Portes and Rumbaut, 2006). The "new" first generation includes 9.1 million foreign-born children who arrived under the age of 13 (these children are included in the definition "children of immigrants") while the absolute numbers of second generation immigrant children with either one or two foreign-born parents totals 7.6 and 13.5 million respectively.

An important implication of the changing composition of the second generation is that a growing proportion comes from Mexico or other Spanish-speaking backgrounds. As we discuss later, language ability is crucial to social mobility and educational attainment, but many children of immigrants now graduate from high school without English language proficiency. Ten percent of all US Kindergarten children were Limited English Proficient (LEP) according to the most recent Census in 2000, falling to six percent of 6th to 12th grade students (ages 12 to 18). Over seventy percent of these children were Spanish-speaking (Capps et al 2005b). This provides a significant contrast with the UK, where a greater share of Commonwealth immigrants (and the absence of a single, dominant second language) means that on average, children of immigrants have more exposure to the English language.

A second important feature of the US social mobility landscape is the large unauthorized population. About one third of the immigrant population is estimated to be illegally resident, and five million children live with unauthorized immigrant parents, even if they are US citizens themselves (Capps et al 2005b). As we discuss later in this chapter, this creates a substantial barrier to social mobility for both adult immigrants and their children.

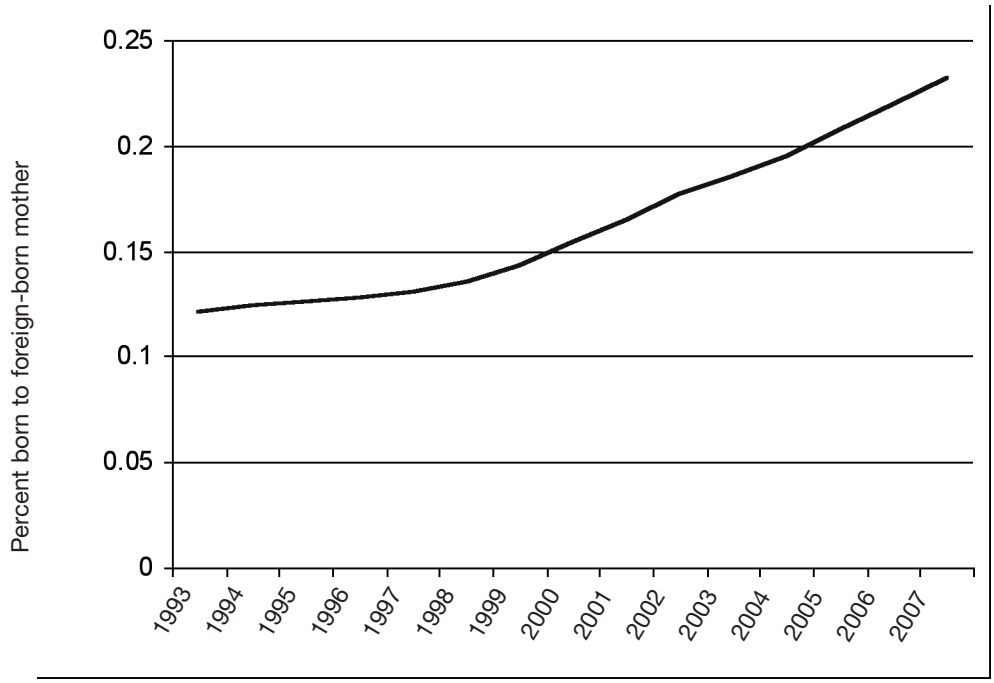
United Kingdom: the size and characteristics of the second generation

In the UK, knowledge of the immigrant second generation is not as extensive. This is primarily because of data limitations which often necessitate a racial perspective as opposed to a nativity or generational lens (statistics use proportions of ethnic minorities without distinguishing between first, second or third generations); methodological issues are explored in more detail below. However, we can sketch out some broad details.

The second generation in the UK usually refers to children of the immigration waves after the Second World War (primarily from countries with colonial ties to the UK; especially from the Caribbean, India, later Pakistan and then Bangladesh). The second generation has been estimated (using General Household Survey data) to number 5.6 million persons (Wright 2005).

The children of immigrants are a group that is growing rapidly, as in the United States. In 2007, 28 percent of all children born in England and Wales had at least one foreign-born parent. This is the highest figure since records began in 1969. The percentage has been increasing steadily over the past decade by about one percentage point per year since the late 1990s, when immigration to the UK began to grow (see Figure 3). Interestingly, the percentage of second generation children born in the UK each year with one UK-born parent is also decreasing steadily (from 56 percent in 1998 to 43 percent in 2007).[5]

Figure 3: Percent of Births to a Foreign-born Mother, 1998–2007



Where do second generation immigrants come from in the UK? Unfortunately, data on parental nativity is not collected in the major government data surveys. However, a look at the birth statistics for 2007 gives us an indication of the origins of second generation children currently being born. Table 2 shows the country of birth of mothers giving birth in England and Wales. About one quarter of all children born to a foreign-born mother in 2007 had a mother from India, Pakistan or Bangladesh. The largest group was from Europe; the increase in European mothers since 1997 is likely to be due to large-scale immigration from Eastern Europe following EU expansion in 2004.

[5] This is presumably a consequence of the growing immigrant population creating a greater tendency for marriages or partnerships between two immigrants. All data is taken from Office of National Statistics Birth Statistics.

Table 2: Country of origin of mothers giving birth in England and Wales, 1997 and 2007

	1979	2007
India, Pakistan, Bangladesh	31%	24%
Other Commonwealth	21%	19%
Europe	24%	28%
Australia, Canada, New Zealand, USA	7%	5%
Rest of World	17%	24%

Source: Office of National Statistics, Birth Statistics, 1997 and 2007.

Detailed information about the characteristics of the second generation is harder to come by, because of data limitations. Dustmann and Theodoropoulos (2006) calculate the education levels of British-born ethnic minorities (a group that has strong overlap with the second generation). Table 3 shows that most groups of British-born ethnic minorities have higher levels of education than White natives, although the gap is larger for males than for females.

Table 3: Average Years of Full-Time Education by Ethnicity and Gender for British-born groups, 1998-2005

	Males	Females
Black Caribbean	12.5	12.8
Black African	15.6	14.8
Indian	14.5	13.9
Pakistani	14.2	12.8
Bangladeshi	13.6	12.9
Chinese	15.1	15.1
Total minority	13.9	13.4
White Natives	12.6	12.6

Source: Dustmann and Theodoropoulos 2006.
Note: Percentages are weighted using population weights

As we will describe later, however, this educational attainment does not translate into better labor market opportunities for all of the groups concerned.

Questioning the level of analysis: second generation immigrants in urban areas

Immigration remains in its largest part an urban phenomenon, which has led several researchers to indicate that a correct frame of reference for social mobility should not be at the national level but at the city (or local) level. In the US, for example, 95 percent of immigrants live in

metropolitan areas (Singer 2008). To illustrate how this has affected the scale of the second generation population in cities, it is worth highlighting the example of California.

In 1990, first generation children of immigrants under 17 as a proportion of all children under 17 totalled 10 percent. By 2006, this figure had dropped to 6 percent. However, the proportion of the second generation had grown by over 50 percent over the same time period, from 27 percent to 41 percent of all children (Fix et al 2008, p 26). Perhaps even more remarkably, over half (62 percent) of children under age 18 in Los Angeles are from the second generation,[6] the majority from a Mexican background.

Immigrants in the UK are also concentrated in urban areas, chiefly in London, where the percentage of foreign born rose in 2006 to 30.5 percent of the population (2.23 million persons); up from 17.6 percent in 1986 (Gordon et al, 2007). The percentage is set to rise further still: more than one in two (54 percent) of all births in London are now to a foreign-born mother (Office of National Statistics, 2008).[7] While there are few statistics on the children of immigrants in London, it has been estimated that approximately 45 percent of children under 15 appear to be born to a foreign-born mother (Gordon et al, 2007, p 31). Table 4 provides a comparison of the cities of Los Angeles, New York and London, which shows the children of immigrants (under 18) in sharp relief.[8]

Table 4: Volume and Share of Foreign-born and Children of Immigrants under 18 in Los Angeles and London

	Los Angeles Metropolitan Area (2007)	New York Metropolitan Area (2007)	London (2005)
Total population	12,875,587	11,607,843	7,518,000
Share foreign-born	36%	34%	33%*
Total children (under age 18)	2,446,372	2,536,517	1,720,000 ***
Share children of immigrants	62%**	52%**	45+%

* Estimate for 2007/08, from Annual Population Survey (APS).

** 2005-7 Three year estimates

*** Age 18 and under (or under age 19).

Sources: 2007 American Community Survey, US Census Bureau; Greater London Authority Statistics based on Census and ONS 2005 mid-term estimates.

[6] Authors' calculation from the American Community Survey (ACS), 2005-2007 three year estimates.

[7] The proportion with at least one foreign-born *parent* in London will be somewhat more than 54 percent, since this number does not include children born to UK-born mothers with a foreign-born father.

[8] Note that while London is by far the main city in terms of immigrant concentration (it houses 39 percent of all immigrants in the UK, according to the 2008 Annual Population Survey); urban immigrants in the United States are divided between a number of metropolitan centers – New York and Los Angeles account for only 14 and 12 percent of immigrants in the United States respectively (data from the 2007 ACS).

However, it is not only policymakers interested in large cities such as London, New York and Los Angeles who face such challenges. Indeed, both the US and the UK have experienced a smaller degree of concentration in the immigrant population in recent years. In the US, the increase in immigration to new "gateway" areas means that many states unused to immigration, such as North Carolina, are dealing with an extraordinary growth in their numbers. This may be reducing the extent to which immigrants and their children are concentrated in the country's major cities. Similarly, the new wave of immigration from Eastern Europe to the UK since 2004 has been characterized by lesser geographical concentration, and local councils across the country have already reported large increases in Polish-speakers and other Eastern Europeans among pupils in local schools. While it is not yet clear to what extent this new immigration will take the form of permanent settlement, as opposed to circular flows, it is certainly possible that a growing Eastern European second generation will establish itself outside of the traditional immigrant center of London.

3. Social Mobility of First Generation Immigrants

A key differentiation in the social mobility literature is a temporal one: whether we discuss mobility over an individual's life course or whether we examine the mobility of families over one or more generations. This paper is primarily concerned with the latter, and in doing so, highlights the crucial social policy question that underpins all such research: how are our children faring? However, both because it is an important issue in its own right and because it influences the performance of their children, we first review the social mobility of adult first generation immigrants.

Economic migrants who come to the US or the UK experience substantial gains in income, relative to what they would have received had they remained in their home country. For example, it has been estimated that for an immigrant who earns the US median income, the gain in earnings over their lifetime is about $100,000 (Freeman 2006). According to another estimate, a Mexican immigrant to the US can expect to receive a return of seven times their wages for the same work (Rosenzweig, 2006).[9] In other words, immigrants gain a huge amount, in purely financial terms, by moving to the US or the UK.

However, if we follow the concept of social mobility over a single individual's lifetime as access to "jobs in line with their potential", many immigrants experience significant downward mobility at the point of migration, since they typically hold jobs of a lower occupational status than their job in the home country, and experience lower employment rates. *Relative to their education level,* more highly skilled immigrants thus tend to have lower wage levels than native workers.[10] Several

[9] Gordon Hanson (2006) estimates the return to be three-fold, a much lower estimate. Either way, however, there is no doubt that immigrants significantly increase their wages upon immigration to the United States.

[10] For a more comprehensive discussion of occupational downgrading among highly skilled immigrants, see Batalova and Fix (2008).

factors contribute to this downward mobility, on both sides of the Atlantic. These include genuine differences in skill level compared to native workers, for example due to differences in the quality of educational institutions, and, crucially, a poor knowledge of the English language especially, although not exclusively, among immigrants to the US (Heath and Cheung, 2007; Kempton, 2002, p 6). They also include problems that are more akin to market failures, such as the difficulties in obtaining recognition for both academic qualifications and vocational credentials and experience, and a lack of knowledge of the local labor market.

Over time, however, this downward mobility generally recedes. Skilled immigrants become less likely to downgrade to less skilled occupations (Batalova and Fix 2008). Immigrants, on average, experience faster wage growth than natives, enabling their wages to converge. The speed at which this convergence takes place, and the extent to which immigrants are able to catch up entirely with native workers during their lifetimes, is disputed, and estimates vary from about ten to about forty years.[11]

Two trends are worth noting. First, the time that immigrants take to catch up with native workers varies significantly by ethnic group. For the US, for example, George Borjas finds that while the earnings of White, Asian and Mexican workers converged with those of natives over time, black and Cuban workers' relative earnings did not increase at all and in fact may have deteriorated over the period of study, 1970-1980 (Borjas 1985). In the UK, white immigrants' unemployment rates fall to a level similar to that of natives within ten to fifteen years. Non-white immigrants experienced higher initial unemployment rates (41 percent, or double the rate of white immigrants on arrival) which fell over time, but never converged with those of white natives (Wheatley Price 2001). Wages, on the other hand, may take longer to converge, even for the groups where convergence is possible: one study finds that white and South Asian immigrants take over 40 years to attain similar wage rates to natives (Frijters, Shields and Wheatley Price 2005).

The second trend is that the rate at which immigrants' earnings catch up with those of natives is changing, becoming slower over time (at least in the US). This has been attributed to the changing composition of immigrants who come to the US – what Borjas calls the decreasing "quality" of immigrants over time.

Why is the mobility of the adult first generation important?

The mobility of the adult first generation matters a great deal, for several reasons. First, even though immigrants gain substantially during the migration process, host societies have an interest in promoting integration in order to improve public confidence in the immigration system. If immigrants are confined to the lowest paying jobs throughout their careers, integration becomes

[11] For the US, for example, Chiswick et al (1997) find that immigrants as a group catch up with natives in terms of employment rates within ten years of residence. For the UK, Frijters, Shields and Wheatley Price (2005) estimate that employment rates did not converge for over 40 years.

very difficult. Second, many immigrants have skills that are not utilized in the labor market, and that could provide significant benefits to host-country economies. Third, immigrants' mobility is closely connected to their children's prospects, since it determines the "distance" that children will have to travel in order to equal or surpass their native-born peers.

Many of these problems can be addressed through government policies. These include better recognition frameworks for foreign credentials, more information about the labor market (including skill requirements), improved provision and delivery of English language tuition and greater orientation or settlement provision. We discuss policies to promote social mobility in more detail in section 6.

4. Social Mobility of Second Generation Immigrants

The scale of demographic reality facing the US and the UK may not be appreciated fully by the populations at large but current trends indicate huge future change and increasing diversity. The children of immigrants are now a substantial and growing proportion of the US and UK populations.

Intergenerational mobility already lags in both countries, and this applies equally to the children of immigrants as to their non-immigrant peers, with at least two additional caveats. First, as the OECD makes clear, "immigrant status" itself influences intergenerational mobility (OECD, 2007). Just as first-generation, adult immigrants experience different trajectories from the native born (as described in the previous section), their children are likely to have different experiences, too. Second, the factor of "immigrant status" often appears alongside or is grouped with "race": immigrants to both the US and the UK increasingly hail from non-white backgrounds.[12] Particularly in the UK literature, it can be difficult to disentangle the effects of race from those of immigrant status. In addition, the fact that immigrants are disproportionately represented in low-income groups (especially in the United States) means that the children of immigrants are likely to face particular barriers to educational and labor market success.

Why is the mobility of the children of immigrants important?

The primary reason to promote social mobility among the children of immigrants is ethical: a penalty based on parental immigration status is a basic barrier to social justice. If disparities in wages or other outcomes are transferred across generations, this problem needs to be addressed at

[12] Membership of an ethnic minority can inhibit advancement (through discrimination in addition to a range of other factors) though in some cases it is thought to aid mobility, particularly if there are dense ethnic networks (Portes and Zhou, 1993).

the same time as the lack of social mobility among those who are not from immigrant backgrounds.

Second, if the second generation suffers downward mobility on certain indicators, for example in labor force participation, difficult questions about the long-term benefits of immigration policies come to the fore.

Finally, the fate of the children of immigrants is a key part of the debate over social cohesion. The perceived risk of a balkanization of society, which manifests itself in concern over a lack of integration, looms large in the immigration debate. Indeed, concerns over immigrant mobility are entangled with some of the increasingly heated debates concerning group identity and integration in both countries – giving social mobility in the second generation particular importance.

The State of Knowledge

What does the evidence on the second generation tell us about their social mobility? In order to answer this question we must first review some of the methodological difficulties in measuring immigrants' children's mobility. After all, the question how the children of immigrants perform is deceptively simple, as it depends on how we measure that performance. Studies have looked at economic outcomes such as rates of labor force participation, wages or income, and occupational advancement. The most widely accepted measure is income. Other measures include levels of human capital (education), levels of poverty or health. In this paper we focus on economic indicators, primarily wages.

Second, researchers differ in their choice of comparisons. Should we compare the children of immigrants to their parents; to their peers with two native-born parents; or to their minority peers with two native-born parents (the third or later generation)? Finally, statistical difficulties are associated with making comparisons over time when the composition of immigrants to the country is changing.

Third, and very importantly, are data limitations. Researchers need data on parents' nativity to draw firm conclusions about the progress of the second generation after they leave their parents' home. In the United States, the Census of Population stopped asking this question in the year 1970; the Current Population Survey started asking about parental nativity on a regular basis in 1994, but is limited by its small sample size; other useful data sources include the Children of Immigrants Longitudinal Study (CILS). The American Community Survey (ACS) provides parental nativity information, but has only existed for a few years.

The data limitations in the UK are even greater. Some data sources, such as the General Household Survey (GHS) and the Office of National Statistics (ONS) Longitudinal Study, include parental class questions, but not nativity. For this reason, researchers have focused on native-born ethnic minorities (using these sources and the Labour Force Survey (LFS)), a group that overlaps substantially with the second generation.

The evidence on second generation immigrant mobility in the US

Concerns over immigrant integration have obscured the fact that in most cases, children of immigrants fare relatively well in the US and UK labour markets – although the findings differ by group, with certain ethnic minorities lagging behind their non-immigrant peers.[13]

The balance of the evidence for the US can be summarized as follows: immigrants' children typically perform better than their parents; currently, the majority also performs better than their non-immigrant peers; however, there is some evidence that this second pattern is changing over time, as the immigrant parents start from an increasingly low base.

George Borjas' review of the evidence (Borjas, 1993, 1995, 2005, 2006) highlights that the second generation improves on the position of their parents. He finds that the relative wages of the second generation are between 5 to 10 percent higher than that of the first. However, Borjas cautions that while the trend is one of "catching up", the socioeconomic status of the immigrant generation and their children is strongly correlated. He calculates that roughly half of the wage difference of the first generation persists into the next generation and posits that "the very large ethnic differences in economic status among today's immigrants will likely dominate American society – and discussions of American social policy – for much of the twenty-first century" (Borjas, 2006).

Immigrants' children make clear gains, therefore, relative to their parents. These gains are particularly striking for Mexican women (Waldinger and Reichl 2007), and it seems likely that this trend may be replicated among second generation migrant women in general (Chen, Conconi and Perroni 2007). Are these gains enough to bring immigrants' children level with their non-immigrant peers? Currently, when we look at the whole of the second generation, the answer is yes. On average, the second generation earned 6.3 percent more in 2000 than their non-immigrant peers (Haskins, 2008, p83).

This headline finding conceals some important detail, however: social mobility is unevenly distributed. In a study of first and second generation immigrants from four groups (Canadians/Europeans/Australians, Asians, Mexicans, and Other (Central and South) Americans), Waldinger and Reichl (2007) find that second-generation Asians perform as well or better than their white counterparts with native-born parents in terms of high school graduation rates, college completion, labor force participation and income. However, Mexicans lag relative to whites with native-born parents (and other groups with the exception of African Americans) on virtually all measures except labor force participation rates.

[13] The stereotype that the children of immigrants do not perform well is prevalent on both sides of the Atlantic and particularly in the US. In particular, it is assumed that current immigrants' children are less upwardly mobile than those of previous waves of immigrants earlier in the 20th century. The work of Nancy Foner and Richard Alba (2006) indicate a much more nuanced view is required and that this assumption should be questioned. For example, they point to the fact that only a small proportion of second generation Italians and Jews had moved into the professional class—6 and 19 percent respectively in 1950—while there were also signs of distress; as many as 10 percent of second generation Italians in New York did not attend school at all (Foner and Alba, 2006).

This raises the question as to how the second generation is set to perform in the future. As Ron Haskins points out, the second generation currently earns more than their non-immigrant peers, but the trajectory is downwards: in 1940 they earned 17.8 percent more; in 1970, 14.6 percent more; in 2000 they earned only 6.3 percent more. This mirrors a similar downward trend in the relative earnings of *first* generation immigrants over the same period, culminating in first generation earnings that were 19.7 percent *lower* than those of natives in 2000. In other words, if the current trends continue, the second generation will earn less than their non-immigrant peers by 2030 (Haskins, 2008, p 83; all statistics are on an age-adjusted basis). It is likely that the changing composition of immigrants to the US, and the increasing proportion of Mexicans (whose children, as we have seen, lag behind their white, native-born peers) have contributed significantly to this trend.

This, therefore, is the underlying concern of Borjas (2006): the upward mobility of the children of today's immigrants is not fast enough to reach parity with their non-immigrant peers because of the very low wages now earned by first generation immigrants to the US. While projections into the future are uncertain, we cannot take for granted that immigrants' children will continue to outperform their non-immigrant peers. In particular, the size of the unauthorized population in the United States holds back social mobility among the first generation, increasing the distance that the children of immigrants must travel in order to reach parity with their non-immigrant peers.

Significant work on the second generation has also been carried out on the city and state levels. A recent multi-method study provides a broad picture of the performance of the second generation in New York, for example. The authors are "cautiously optimistic" for the prospects of the second generation – for example, highlighting that two fifths of the second generation have surpassed their *parents* on education and labor force measures, especially for groups of Chinese and Russian Jews, and with little evidence of decline for any group except Dominican men (Kasinitz et al., 2008, p 16, p 342).

In a similar vein, Ruben Rumbaut and Alejandro Portes's work on the children of immigrants in San Diego and Ft. Lauderdale – based on a decade-long panel survey called the Children of Immigrants Longitudinal Study (CILS) – shows that the second generation are performing better academically than their peers, though, once more, the Mexican second generation in San Diego performed below their non-immigrant peers and that of other second generation ethnic groups (Portes and Rumbaut 2005).

The evidence on second generation immigrant mobility in the UK

Due to data limitations, research in the UK has focused on ethnic, rather than immigrant status in the second generation. However, since large-scale immigration of ethnic minorities is primarily a post-war phenomenon (with the exception of Black Caribbeans), there is substantial overlap

between UK-born ethnic minorities and second generation immigrants. Again, the body of research is much smaller than in the US. We discuss some of the primary studies here.

Dustmann and Theodoropoulos (2006) study the performance of UK-born ethnic minorities and compare it to that of their white, UK-born counterparts and that of their parents' generation. They find that British-born ethnic minorities (their proxy for the second generation) have on average significantly higher education levels than their parents' generation *and* relative to their white peers. However, this does not translate fully into better employment prospects: while British-born ethnic minorities earn more than white natives (if they participate in the labor force), the gap is not as large as it ought to be given differences in characteristics such as education and regional location.

In another study on the performance of ethnic groups, Platt (2005) examines intergenerational mobility between 1971 and 1991, to determine the extent to which individuals' social class is determined by that of their parents (post-migration). Because it is a longitudinal study and includes data on parents' occupation, it avoids the problems associated with trying to measure intergenerational mobility by comparing the change in a group's average outcomes over time. The study finds that intergenerational mobility varies by ethnic group, with minorities experiencing less correlation between the social class of parents and children. In particular, children with Indian parents experienced greater upward mobility to their white native-born peers, allowing them almost to catch up with white workers despite starting from a lower base. On the other hand, the Caribbean second generation experienced more limited upward mobility and more frequent downward mobility.

Platt (2007) points to similar results: parental class played a smaller role in determining current social class for minorities than for white native-born individuals, with specific variation by group. In particular, minorities were able to use education to achieve upward mobility, but second generation Pakistanis showed lower levels of upward mobility than their white British counterparts, even when taking account of their educational levels.

Finally, Heath and Ridge (1983) examined the role of social class in the labor market performance of ethnic minorities in a major article in the early 1980s, based on the Oxford Mobility Survey. They found downward mobility for the second generation. Later work (Heath and McMahon, 2005) uses pooled data from the General Household Survey, and finds complex outcomes that are different for different groups and in different occupational classes. However, a strong drawback of this work from a policy perspective is that it does not specifically account for parents' *post-migration* social class.

Key points in the literature

In summary, the literature in both countries points to the following general conclusions:

- First generation immigrants gain significantly in terms of wages during the migration process, but they often downgrade to less skilled occupations.
- The children of immigrants in both the US and the UK, on average, perform better than their parents.
- On average, the second generation earn more than their non-immigrant peers, although there is substantial variation by ethnic group or nativity, with some groups much less likely to experience upward mobility. Some immigrant groups are more successful (Asians in the US; Indians in the UK); others are less successful (Mexicans in the US; Pakistanis in the UK).
- These trends mean that strong upward mobility in the second generation cannot be guaranteed in the future. Especially in the US, there are signs that immigrants' children may fall behind their non-immigrant peers in future decades.

5. Determinants of Intergenerational Social Mobility

It is perhaps too obvious an observation to note that a significant number of factors shape mobility. For analytical distinction we divide the determinants of the social mobility of the children of immigrants into three broad categories:

- Inherited characteristics such as wealth or the human capital of parents as well as less tangible characteristics such as hard work, luck or thrift.
- External drivers in the receiving society, such as the economy, healthcare, local communities, or access to and quality of educational opportunities and institutions.
- Factors that span both of these categories but are distinguished by being directly related to immigration, including discrimination and attitudes towards immigrants or ethnic minorities, immigration policy and law constraints and cultural assets associated with immigrant groups.

We do not provide a full review here of the drivers of social mobility, which can be found elsewhere in this volume and in Strategy Unit (2008). However, our purpose in outlining these three sets of categories is to move towards a discussion of *policy interventions* relevant to immigrants and their children. As a result we do not focus on the inherited factors in the first category, even though they may have a strong effect on mobility. That said, we do note that the characteristics of immigrant parents have implications for immigration policy insofar as countries control selection of those parents through the immigration system. When discussing the second category – the external

drivers – policy interventions primarily involve ensuring that immigrants and particularly their children have access to the same access to opportunities as their non-immigrant peers.

Our primary focus in this paper is the last category: factors directly connected to the immigrant experience that may impede or accelerate social mobility. Most studies on social mobility do not refer to this set of factors, and if they do, have little information on whether they are important. The OECD review of intergenerational mobility for example ranks variables according to whether they have a "large", "significant", or "little" effect on social mobility. The review refers to "migrant status" as a "significant" factor (OECD, 2007). While not defining migrant status, the OECD review groups it with race and appears to refer to the legal status of the migrant.

Immigrant-specific determinants of social mobility

Many of the potential or current government policies to promote social mobility apply equally to both immigrant and native families – as long as immigrants are not specifically excluded from services (exclusion from publicly provided benefits such as welfare payments or health services are more common for first generation adult immigrants than for their children). What are the *immigrant-specific* determinants of social mobility? We provide a very brief review the following factors:

– ethnic networks and residential segregation
– language
– parental investment in children's development and intergenerational transmission of culture
– visa restrictions and legal status

Education – one of the strongest determinants of social mobility for both immigrants non-immigrants – is discussed at length in Section 6 on policy recommendations.

Ethnic networks and residential segregation

A large literature exists on the role of ethnic networks in shaping first generation immigrants' labor market outcomes (for a review, see Patacchini and Zenou 2008), and the social mobility of the second generation (see Alba and Nee 2003, Borjas 1995, and Ioannides 2000, for example). Researchers disagree on the contribution of ethnic networks – whether they help members by providing access to jobs, or whether they hold them back by segregating them from the rest of society. The balance of the evidence suggests that ethnic networks may help in the short run, but prevent social mobility and assimilation in the long run. Connected to the question of ethnic networks, therefore, is the role of place, or neighborhoods. Several researchers have pointed to the importance of neighborhoods in explaining social mobility (Platt 2006, p 75). These effects can be positive (providing peer support through social networks, as well as assistance in finding jobs) or negative (including safety, crime or the potential for social stratification) (Topa 2001).

Residential segregation is important to the second generation in particular, because it strongly affects the quality of amenities such as public schools (Alba and Nee 2003). In addition, George Borjas (1995) shows that intergenerational mobility is shaped by ethnic networks. In some segregated neighborhoods, the correlation of parents' and children's outcomes is increased. This implies a positive effect for the children of immigrants in groups that outperform natives, but a negative effect for groups that occupy lower positions in the labor market.

Language

For first-generation immigrants, language is crucial to economic integration and upward mobility. As noted earlier, both skilled and unskilled immigrants suffer wage penalties when their language skills are poor (Chiswick and Miller 2007). These problems are not limited to first-generation adult immigrants: children with limited English proficiency have lower educational attainment and are more likely to drop out of school (Capps et al 2005b). Given that educational attainment is the primary mechanism that immigrants use to gain upward mobility (Haskins 2008; Platt 2005), and since language is also crucial to labour market outcomes even holding constant educational achievement (Chiswick and Miller 2003), children of immigrants who fail to acquire sufficient mastery of English will be at a substantial disadvantage.

Parental investment in children's development and intergenerational transmission of culture

As noted in section 4, the labor market success of the second generation is correlated with that of the first generation. In the United States, official poverty rates are substantially higher for children in immigrant families than for those with native-born parents – 21 percent compared to 14 percent for the non-immigrant group (Hernandez 2004). Parents with more resources are in a position to provide better opportunities for their children – particularly in the US where there are fewer government-provided services and low-income immigrants (particularly the unauthorized) have limited access to early education programs and child care (Capps et al 2005a). Since immigrants are overrepresented among the least educated who are least likely to have children in center-based care, this creates particular barriers to social mobility.

More controversially, parents affect their children's development and future success in non-financial ways – for example through the intergenerational transmission of culture. While a full discussion of these factors is beyond the scope of this chapter, we simply point to some provocative research findings.

In an ethnographic study of New York, Kasinitz et al (2008) examine the intergenerational transmission of culture. In explaining the success of the children of Chinese immigrants, they find that "family strategies for the accumulation and intergenerational transfer of capital may be more important than race or parents' nativity" (p361). For example, the authors contrast the way in

which the Chinese consider success as a professional occupation, money, education and progress towards goals, whereas Columbians and Peruvians conceive success as stability (marriage, children), material goods and education – though importantly Columbians and Peruvians consider a high-school and not a college education to be sufficient success (p87-89). Similarly, the authors find that the two best performing groups – Chinese and Russian Jews – are more likely to speak English at home. In another study, Grace Kao (2004) shows that in the Asian community, children of immigrants are more likely to discuss college-going with their parents than their non-immigrant peers are. This does not, of course, mean that culture is a primary determinant of intergenerational mobility, and there are huge difficulties in disentangling the effects of culture, location, discrimination, educational opportunities and a host of other factors.

Finally, parents' investment in their children's human capital has been found to be related to their return migration intentions, with immigrants who have settled permanently being more likely to push their children to gain more education (Dustmann 2007).

Visa restrictions and legal status

Obstacles to permanent settlement may affect intergenerational mobility, as discussed. Similarly, a host of factors affecting immigrant parents' ability to integrate socially and economically will be shaped by the terms and conditions of immigration, including their legal status. Unauthorized immigrants, in particular, have their own social mobility held back, since the jobs in which they can work are limited. This, in turn, will affect the prospects of the second generation. Illegally resident immigrants may avoid contact with institutions such as public schools for fear of legal consequences, even though their children have the right to attend (Capps et al 2005b). We examine this in more detail in the next section.

Are there adverse effects of immigration on overall social mobility?

This paper focuses on the social mobility of immigrants and their children. However, immigration is potentially connected with social mobility in another way: the question whether immigration has impacts on the social mobility of natives.

The impact of immigration on native workers labor market outcomes (primarily wages and employment) has been extensively studied. A full review of the evidence can be found in Somerville and Sumption (2009). Here we outline the key findings. The academic consensus, insofar as one exists in this controversial field, is that immigration does not reduce native wages or employment, on average. However, there are distributional effects: some gain while others lose – and those who lose are the lowest skilled, who are already in a precarious position because of numerous other factors such as economic restructuring, trade and technological change. That said, and perhaps most importantly, the impact of immigration is dwarfed by that of other factors: for example, several years of sustained high immigration is thought to have only a fraction of the impact on an individual's wages compared to what that individual could gain from an additional year of education. Essentially this suggests that the low-skilled stand to benefit much more from policies to boost their skills and employment opportunities, than from policies to limit immigration (Somerville and Sumption 2009).

However, the studies described address short term impacts, not longer term social mobility. To our knowledge, no study has addressed the long-term consequences of immigration on mobility, for example using longitudinal datasets.

6. Policy Discussion and Recommendations

It is clear from the discussion of the determinants of mobility that some factors can be changed through government policy and some cannot. In this section we outline policies that could promote mobility, particularly among the second generation.

This policy discussion is anchored on the assumption that, barring extraordinary circumstances[14], immigration streams and human movement will continue much as they have, if without the "exuberance" about the value of truly large-scale immigration that both countries have exhibited in recent years – and the reaction that such very large immigration numbers have created. This is not an uncontroversial position, particularly in the UK, although it could change if the current economic downturn lasts much longer than expected. Furthermore we work from the assumption that the goal is to improve social mobility as far as possible.

[14] Out of control terrorism and persistent and increasing illegality are two such circumstances.

How can we adjust immigration systems to improve social mobility?

Immigrant selection systems

Most immigration systems do not specifically consider immigrants' capacity to integrate as a selection criterion (Canada and Australia are notable exceptions). Instead, they represent the sum of a series of commitments, developed over time (and sometimes legally mandated) to family immigration flows, asylum and worker flows aimed at filling specific labor market needs or shortages.

One way to improve integration – and hence social mobility – is to select labor migrants more carefully. However, this may be easier said than done. On the one hand, employer-led systems (where employers select candidates for specific vacancies then petition government for work authorization on their behalf) allow for the selection of immigrants who have a high degree of labor market "fit": since one must have a job offer to immigrate, the risk of immigrant unemployment is greatly reduced. However, this system alone does not allow governments explicitly to select immigrants on the basis of their capacity to integrate socially as well as economically, for example by requiring employers to recruit individuals with good language skills. On the other hand, points systems (where the government selects immigrants according to certain pre-determined criteria) allow governments to prioritize certain integration-related characteristics, but fail to differentiate important skills and qualities of the kind that employers can elicit during an interview (for more information on points systems, see Papademetriou, Somerville and Tanaka 2009).

Legal Residence

Permanent visas may offer advantages to the mobility of immigrants' children. As noted, research shows that the performance of the second generation is positively correlated to the permanence of immigration (Dustmann, 2007). The policy implications may be that temporary migrants who bring families should be given options for permanent settlement. (Such a view also converges with US evidence that the longer the length of stay the more likely a migrant is to invest in his or her own human capital).

The more vexed policy issue, however, concerns illegally resident immigrants and more particularly their children, who may be denied opportunities at school and college and in other areas of life. The lack of legal status acts as a very strong barrier to social mobility for immigrants and their children (see Passel 2006). In the US, five million children live with illegally resident parents; approximately two thirds are US citizens (Capps et al, 2005a; Capps et al 2005b). Even those children with citizenship are likely to be affected by their parents' immigration status, if their parents do not have a legal right to residence, as noted earlier.

The policy prescriptions associated with illegally resident immigrants are usually centered on deportation, regularization or amnesty. (For a discussion of the regularization policy option in both the UK and the US debate, see Papademetriou and Somerville, 2008; Papademetriou, 2005).

How can we improve the mobility of second generation immigrant children through public policy interventions?

The most important group of interventions to promote social mobility (among both immigrants' children and natives) is education, the focus of the rest of this section. In most cases, education policies do not need to be targeted, but can be most effective when introduced on a universal basis – although there are some cases where specific adjustments are needed for the children of immigrants, as we will outline.

Note that the age structure of the children of immigrants places them predominantly of school-age or younger, making education measures potentially very effective. For example, approximately 70% of each of the Mexican, Asian and Central American second generation was in the US under the age of 20 in the year 2000 (Waldinger and Reichl, 2007, p 23).[15]

Early Education

The literature on early education (Bialystok, 2001; Leseman, 2002, 2007) of second generation immigrant children identifies several specific causes of disadvantage. Among them are:

- An accumulation of socio-economic and psychological 'risks' such as unemployment or stress that are worsened if linked to minority status, perhaps because of discrimination;
- A lack of cognitive stimulation and language development in families (this refers particularly to informal schooling and home literacy);
- Different cultural beliefs determining parenting style – immigrant children may come from homes where "collectivist" as opposed to "individualistic" traditions dominate, with negative impacts on school performance.

Our review of the literature suggests that the best model for early education is the option of child-focused, center-based care of high quality that is comprehensive and universal. As noted earlier, however, immigrants share characteristics with the groups that are least likely to enroll their children in center-based care, at least in the US (Capps et al 2005a). Further policy design elements that are crucial to the performance of the second generation (Leseman, 2007) include:

- Ensuring that there is continuity from early education care into primary school, particularly in terms of support for bilingual children. The patchwork nature of early education means any degree of continuity is often lost yet can have a significant impact on performance;
- Culturally appropriate provision of early education (such as an understanding of diversity);
- Family-support measures, aligned to primary schooling, can overcome the reticence of first-generation migrant parents and indicates that outreach work is crucial.

[15] Note also that the interventions below form part of the larger policy field of immigrant integration. For a fuller discussion of integration policy, see Fix (2007).

In the ongoing evaluation of the UK's SureStart program, some of the findings of the relatively critical report on provision to Black and Minority Ethnic populations (Craig et al., 2007) offers both support and differences (namely on how far to target communities) for the policy recommendations above.

School-age interventions

There are several options for improving the situation of second-generation children through school-age interventions (Crul, 2007). Institutions in receiving countries, especially schools, make a difference. However, the consensus of the literature appears to indicate that some of the more "direct" interventions may stigmatize the children of immigrants or cause resentment among the native population. There may also be questions of social justice involved in such interventions. Policy thus should be as comprehensive and universal as possible; where there are specific immigrant needs, policy interventions should be aware of how such measures will be perceived. There are four interventions that are likely to have a significant impact on the children of immigrants:

- Lowering the compulsory schooling age as a way of promoting language acquisition.
- Increasing the number of contact hours in schools. (Both this and the preceding recommendation are hardly cost-free proposals, however.)
- Creating "second chances" to help students overcome disadvantages. This could include delaying moving students into ability streams or more likely academic/vocational tracks for an additional one to two years and placing students in intermediary classes.
- Finally, there is evidence that apprentice-type programs, or programs that give students the chance to work with companies for a period of time, could help smooth the transition into the labor market (Crul, 2007).

Language

Language skills are crucial to achievement, with more than half a grade level separating immigrant students who do and who do not speak the language of instruction at home (Christensen and Stanat, 2007).

Three recommendations relevant to the US and the UK include:

- Investment in efficient and effective models of language support at all education levels. Immersion with language support seems to work if the programs are systematic with explicit standards and requirements in place (see below). Language support programs should be available to students from pre-primary through secondary school.
- Ensuring that the programs have guiding principles, goals and standards, and benchmarks for measuring progress. Language support programs should have frameworks describing the guiding principles of the language support program to be implemented. A sufficient amount of time should be dedicated to language support programs.

- Training teachers in second-language acquisition. The most effective training will most likely cover implicit and explicit language support. Explicit language support requires that teachers have strong linguistic knowledge, so that they can effectively teach grammar. They must also be aware of the language structures that present the main hurdles in second-language acquisition and how these can be overcome. Moreover, classroom and language teachers should work in co-operation.

7. Conclusions

This brief paper has selectively outlined the skeleton of the massive body of work on immigrant mobility. We have argued that the second generation in the US and the UK is performing better than their parents on virtually all counts, suggesting intergenerational upward mobility, a fact that does not appear front and center in the literature. However, while many of the children of immigrants perform better than their non-immigrant peers, certain groups (such as for Mexican American children in the US and Pakistanis in the UK) lag behind.

That said, there are many policy interventions that can help to promote social mobility among immigrants, and especially the second generation. Serious thinking about, and investment in immigrant integration – in language and in schools in particular – will be essential in any efforts to increase the social cohesion and mobility for all residents. Certain changes to immigration systems would also be fruitful.

8. A New Research Agenda

Significant additional research efforts are needed, particularly in the United Kingdom, on what we know about the children of immigrants.[16] In particular, we believe that the following areas deserve further research:

- The changing labor market experience of second generation immigrants, especially in the UK. (This research is in part dependent on improved parental nativity statistics).
- The career trajectories and occupational choices of young second generation immigrants, and the extent to which these are shaped by their immigrant backgrounds. What are the characteristics and skills of those who move up job ladders compared to those who do not?

[16] Further work on the Labour Force Survey (LFS) and General Household Survey (GHS) would yield useful results although there is clearly room for much more significant work to be undertaken under the auspices of the ONS Longitudinal Study. For the US, major opportunities will be presented by the American Community Survey (ACS), which asks parental nativity questions.

- The importance of immigrant background in determining the prospects of immigrants' children, relative to other factors that affect their mobility. In particular, how do the outcomes of English Language Learners (ELL) affect their future integration?
- The determinants of parental investment in children, and how mobility differs depending on the characteristics and circumstances of immigrant groups.
- The importance of immigration policy barriers, including legal status. How might legalization policy affect social mobility of immigrants and their children?
- The effectiveness of policy interventions for the second generation. Where are the "leaks" in the institutions that prepare youth and others for work and what systemic repairs are needed?
- The role of changing patterns of immigration (for example the new "gateway cities" in the US, or the greater geographical dispersion of recent Eastern European immigrants to the UK) in determining social mobility, and its implications for the "next" second generation in years to come. Such research may have important implications for preparing early and effective integration policies in areas that are not used to receiving immigrant flows.
- The effect of more transient migration (particularly in the UK, where temporary migration appears to be becoming substantially more common) on social mobility and the effectiveness of policies to promote it. For example, how are schools and other educational institutions coping with unpredictable migrant flows?

Comparative research

As noted earlier, making direct comparisons between first and second generation immigrant groups in different countries is problematic. However, some research paths should be considered:

- How have the experiences of the first and particularly second generations differ in the US, UK and other large-scale immigrant-receiving countries such as Canada and Australia? Is it possible to point to policy differences that explain some of these effects?
- What can we learn from the policy experience of developed countries beyond the UK and US, for example The Netherlands, Belgium, France, Germany and Sweden?
- City-to-city comparisons: how has the urban environment (including public schools, job opportunities in a range of sectors, and the presence of ethnic networks) shaped the outcomes of the second generation differently?

Finally, we believe that in light of the demographic realities, much greater efforts are also needed to incorporate the children of immigrants into broader research on social mobility. Such work is often relegated to the sidelines, and this underestimates its importance.

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