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The Changing Economic Advantage From Private School

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Executive Summary

Private schools in the UK, though far less numerous than state schools, have for a long time played a very prominent role in the UK"s economy and society. There is ample evidence that private school attendance generates significant economic advantages later on in life as individuals earn more in the labour market and are more likely to get top jobs. But we know very little about how the economic and social impact of private education has evolved. In this paper we provide empirical evidence on the extent to which private/state school wage and education differentials have changed over time.

Rising wage inequality and falling social mobility form the backdrop. Reasons to expect an increasing advantage for private school pupils over the last several decades include the internal transformation of private schools with an increasing emphasis on academic achievements, and the substantive rises in the resources available, supported by increasing real fees which, in the context of the emergent knowledge economy and rising female labour force participation, parents were willing to pay.

Using data from the National Child Development Study and the British Cohort Study, we examine how pupils born respectively in 1958 and 1970 were faring in the labour market by the time they had reached their early 30s. We show that the private/state earnings log wage differential rose significantly from 0.07 to 0.20 points (and thus the premium rose by 15 percentage points) between the two cohorts, after controlling for family background characteristics and for tests of cognitive and non-cognitive skills that they possessed at an early age. We also find that the private/state gap in the chances of gaining a higher degree rose from 0.08 to 0.18 between the cohorts. Our estimates imply that half the rise in the earnings differential can be attributed to the improved qualifications being achieved in private schools. These results are reinforced by similar findings based on successive cohorts in the British Household Panel Study.

Since the composition of private school participants – from the perspectives of parental income, demographic characteristics and early-age test scores and non-cognitive skills – remained steady between the cohorts, we think it unlikely that the increased differential could be accounted for by any change in the selection of private school attendees.

As private/state earnings and education differentials have widened out at the same time as rising wage inequality, we suggest that type of school attended is likely to have been a factor at play. From this perspective, falling social mobility (as captured by the correlation between own and parents' incomes, documented in previous studies) is more connected to rising private/state earnings differentials than to any change in the social or economic composition of private school participants.

Using an approximate calculation, the average net return to investment in a private school education in 1980 was 7% for boarders and 13% for day students. Since these pecuniary estimates exclude hard-to-measure consumption benefits during and after schooling, they should be regarded as likely to be underestimates. In effect, private schools provided very good value for money. However, since selection into the schools, despite some bursaries and the Assisted Places Scheme, is primarily based on families" ability to pay, it is hard to escape the conclusion that private schools during the period under examination also served to reproduce inequalities in British society. Ongoing research is needed to investigate whether more recent private school graduates are benefiting from still larger premiums to match the rising fees.

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1   Introduction

Private schooling, in its various guises, is an important feature of education systems across the world. The existence of a private education sector generates the possibility for parents to opt their children out of state provided education. In the case of the UK, private schools, though far less numerous than state schools, have for a long time played a very prominent role in the UK"s economy and society.[1] There is ample evidence that private school attendance generates significant economic advantages later on in life as individuals earn more in the labour market and are more likely to get top jobs.[2] Indeed, the notion that privilege and later success are conferred on those attending private school remains a politically charged issue of debate.

Given this, it is surprising that we currently know very little about how the economic and social impact of private education has evolved over time. We know next to nothing about how the higher earnings of the privately educated and their ability to successfully access jobs higher up the occupational ladder have shifted through time, nor what the drivers of any observed shifts might be. This therefore forms the subject matter of this paper. We provide a range of empirical evidence on the extent to which private/state school wage and education differentials have changed over time, and discuss possible transmission mechanisms that could underpin the observed trends.

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[1] For example, in the UK there is plenty of descriptive evidence showing that, relative to state schools, private schools educate a significantly disproportionate number of those who find economic, political and social success in later life (Sutton Trust, 2005a, 2005b, 2006; Boyd, 1973; Reid, 1986).
[2] See, *inter alia*, Dolton and Vignoles (2000), Dearden et al. (2002) and Naylor et al. (2002).

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The economic and social backdrop to this is important. Much has been made of the rises in wage inequality and falls in social mobility that have occurred in the UK in the last thirty to forty years (see Machin, 2010, or Blanden and Machin, 2008). Yet, we do not know whether private versus state school attendance, and any change in the economic advantage conferred on private school attendees, has contributed to these significant shifts.

In this paper we therefore investigate the changing association between attendance at a private school and subsequent economic success in the labour market. We connect our findings to the discussions of changing wage inequality and social mobility, and also to the changing nature of the market for private schools. This is important as private school fees have risen very sharply over time and, as school fees ration access according to family wealth, the larger the economic advantage of private education needs to be to generate a 'payoff' for parents investing in such education for their children.

We document evidence that the private/state school wage differential has risen significantly over time, alongside rising costs of sending children to private school. A significant factor underpinning this has been faster rising educational attainment for privately educated individuals. Despite these patterns of change, the proportion attending private school has not altered much, nor have the characteristics of those children (and their parents) attending private school. This is suggestive that the pattern of sorting into private schools may not matter much in accounting for changes in wage and education differentials through time. Taken together, our findings are consistent with the idea that the private school sector has successfully used its increased resources to generate the academic outputs that are most in demand in the modern economy. Moreover, because of the increased earnings advantage

private school remains a good investment for parents who want to opt out, but this increase has also contributed to rising wage inequality and falling social mobility.

The rest of the paper is organized as follows. In Section II we briefly review the marked changes that have taken place in private sector education provision over the last thirty years or so, and discuss the small body of work studying the economic advantages associated with private school attendance. Section III describes the data used in this study and presents some initial descriptive statistics. Section IV presents the empirical results. Section V offers an interpretation of the findings, connecting them to the wage inequality and social mobility literatures, discussing sorting and selection into private school, and offering a calculation of the net returns to private school investment implied by our gross wage return estimates and information about average school fees. Section VI concludes.

2   The Changing Private Education Environment in Britain

Historical context

Private schools in Britain have a long history dating back at least to 597 AD. In any modern economy with a fully-fledged education system, however, private schools have to contend with the threat that the state will crowd out private investments in time-honoured fashion. Private schools have, therefore, to offer their potential clients something in addition. Top of the list for most schools come better teaching resources, and supportive peer effects through selective admissions procedures. Private schools may also cater for pupils with specialised

needs or with religious preferences, the latter being a common hallmark of private schooling in many countries.

From the parents' perspective, outcomes of the investment in private school education can be academic (better qualifications, access to better universities) or non-academic (the „rounded individual", the „confident leader", better „soft skills"). Either the improved qualifications, or the non-academic outcomes, or both would then deliver economic returns to the investment as gauged by better pay or access to higher-ranking jobs (perhaps via higher-ranking university education). Such schools might also be thought to provide access to „old boys" networks" or „old girls" networks". To compete with state education, schools can also deliver consumption services superior to those available in government schools or elsewhere: sports facilities and tuition, music and other cultural goods, which are tied with the academic education package.

This range of strategies affords room for a variety of private schools, with mixed offerings and pricing structures. Indeed, private schools in Britain are quite heterogeneous. They include the traditional „public schools", the ex-direct grant schools, other private secondary schools, the prep schools, and a small number of pre-prep and specialist schools. Many are for boarding, either exclusively or as a choice; almost all used to be single-sex, though many are now co-educational. Schools vary also in their mix of emphasis on academic and non-academic outcomes; and there is additional variation by religious affiliation. Nonetheless, what all private schools share is the facility to offer something different from state-maintained schools in return for a fee. To represent their common interests, most private schools belong to one or more of ten associations, which in turn are members or affiliates of the Independent Schools Council (ISC).

Recent changes

The emphases of private education have changed over recent decades. In Rae‟s (1981) perspicacious insider account of the public schools in the 1960s and 1970s, he describes how the schools were obliged to adapt to a new and uncertain environment, characterised by changes in state education, associated political conflict over private schooling, and changing social mores. During the 1950s and 1960s, there had been growing unrest about the UK educational system, primarily surrounding the use of selection at age 11 and the continued existence of the private educational sector, which was seen as a bastion of the upper classes. In 1964 Harold Wilson became Prime Minister as leader of the Labour Party, with commitments from the previous year‟s party conference to call for an end of the selection system and tackle "the problem of public schools". By 1965 the government had asked Local Educational Authorities (LEAs) to draw up plans to convert to a comprehensive system, and appointed a commission to review private education. One of the recommendations (later accepted) from its second report was the abolition of Direct Grant grammar schools, which were partly fee-paying, partly subsidised and academically selective. These schools were given the option of joining the comprehensive system or becoming fully private, which is what two thirds of them did. While the commission did not broaden its attack on the rest of the private school system, political uncertainty remained and in 1973 the Labour Party in opposition drew up a long-term strategy for proscribing private education altogether. Only when these plans were abandoned once in power (supported only by a thin majority) was the threat to private schools alleviated.

The need for political legitimacy in the face of ideological opposition is advanced by Rae as one reason why private schools were starting to become more academic over this period.

Other pressures came from above – a decline in monopoly access to Oxford and Cambridge universities, the rise of other universities – and from below in the form of growing parent power. At the start of the 1970s private schools saw an opportunity in the closing of grammar schools around the country, with groups of parents fearing the effect the new comprehensive system would have on their children. These parents had only two options: to band together and appeal to their Local Education Authority (LEA) to maintain the selective schooling system or to send their child to a private school. The former was only moderately successful, with 19 out of 138 LEAs remaining selective.[3] For private schools to take full advantage of grammar school closure they needed to attract parents by showing them that they provided an educational product worth paying for. All these factors meant that the private schools "became more ruthless and single minded in their pursuit of academic success" (Rae, 1981: 155). The balance of the curriculum shifted away from the traditional emphasis on classics towards the sciences (Sanderson, 1999: 102-3). More entrance exams were introduced and pass marks were raised. Schools advertised their ever-decreasing pupil-teacher ratios, the average A-level grades of their pupils, and the number of leavers attending Oxbridge; and they became themselves more business-like in their management.

These internal changes within private schools, along with the changing economic and political environment, coincided with a reversal of the schools" fortunes. The sector, parts of which appear to have been in terminal decline during the 1960s and up until the mid 1970s, enjoyed a proportionate stabilisation and then a revival from the late 1970s. Figure

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[3] It has recently been shown (Manning and Pischke, 2006) that these remaining LEAs are not random, and selection to undertake the comprehensive system was correlated with the socio economic background of its population.

1, which shows the proportions of full time pupils, schools and teachers in the private sector since the mid-1960s, very clearly shows this revival of fortunes.[4]

Though the „revolution", as Rae termed it, was said to be over by 1979, this was only the start of an era in which parents would be willing to pay continuously-increasing real fees for private education. Figure 2 shows the scale of these increases. Rising fees can be rationalised if parents expect to get increased benefits for their money, including rising earnings differentials (relative to a state education). Two broad socio-economic trends lay behind the rising propensity to pay: the "knowledge economy", implying skill-biased technological change (Berman et al., 1994) with a rapidly-rising demand for qualified labour, and increasing female labour force participation. The former meant that high-level qualifications were going to be increasingly necessary for economic success, in contrast to previous eras when lower qualifications combined with family and school connections were enough. The latter meant that girls were increasingly committed to a successful future in the labour market, with its academic demands.[5] These broad trends applied to all pupils, but the greater flexibility of the private sector, not held back by fiscal or political constraints, enabled it to offer the required improved academic services. The premium for private education would thus be predicted to have increased in this period. One indication of improved services is that the pupil-teacher ratio declined slowly through the 1970s and more rapidly since then (Figure 3).[6] The drive towards academic achievement was also given added emphasis at the margins by the secession of the direct grant schools and later

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[4] See Glennerster and Wilson (1970: 131-8) for a contemporaneous dissection of the reasons for private sector decline.

[5] Even among boys, the increased fees were said to generate a moral commitment to try to „do well" (Walford, 1986: 242).

[6] Within the private school sector, there is evidence that lower pupil-teacher ratios lead to superior academic performance (Graddy and Stevens, 2003). Also, for evidence on competition between private and state school teachers see Green at al. (2008).

by the Conservative government's Assisted Places Scheme which, from 1980 onwards, began to subsidise private school places for a small proportion of able pupils.[7]

The aggregate outcome of these developments has been that the academic achievements of private school pupils have been maintained, or even increased, relative to those of state-school pupils, despite the continued improvements of the latter as the education system expanded in the late 1980s and 1990s. At the top, especially, private schools re-asserted and defended their share of places at Oxford and Cambridge despite the earlier loss of traditional exclusive routes. The lowest points in Oxford and Cambridge acceptances from private schools were encountered in 1976 and 1980 respectively (see Figure 4). The early 1980s leap in their Oxbridge success rates is partly associated with the addition of the previous, highly academic, direct grant schools; but the rate was maintained at a high level, in the range 45% to 55%, until the present. More broadly, private schools tend on average to score higher than state schools on sixth form value-added measures.[8]

High aggregate success rates do not, however, prove anything *per se* about the efficacy of private schooling in generating academic achievements or higher pay, if only because private school pupils come from well-resourced family backgrounds and are often selected on cognitive ability as well as ability to pay. Formal evidence, which conditions for these background variables, is necessary.

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[7] Though means-tested, the scheme's beneficiaries were often children of professional and managerial parents, many of whom had been at private school (Fitz et al., 1989; Power et al., 2006; Power et al., 2009)).

[8] National Statistics, *Bulletin*, Department for Education and Skills, 2004, Issue 01/04, May. http://www.dfes.gov.uk/rsgateway/DB/SBU/b000467/index.shtml

Existing evidence on the economic and education advantages of private school

There are just a few studies that consider the economic and education returns to a private school education in Britain. On education, for both sexes, there is sound evidence that private schooling raises overall academic achievements (Dearden et al., 2002).[9] A caveat to this finding, though, is that on average university students who had attended a private school are, *ceteris paribus*, less likely than similar students from state schools to obtain a good degree (Naylor and Smith, 2004; Smith and Naylor, 2001, 2005).[10] Nonetheless, recent work also shows those educated at private school are significantly more likely to go on to postgraduate education (BIS, 2010; Machin and Murphy, 2010).

In terms of wages, Dolton and Vignoles (2000) report a premium on wages of approximately 7% six years after graduation, using a sample of 1980 graduates. Dearden et al. (2002), while investigating school quality, report a 20% wage premium (after allowing for highest qualification) at age 33 for employees who had attended private school at age 16 in 1974; but found no evidence of an effect at age 23, or for females at either age. Covering a later time, Naylor et al. (2002) found an average private-school premium of 3% for university students graduating in 1993; they also found considerable variation in the premium, which was positively correlated with the fees paid.

In total, not a great deal is known about the economic impact of private schools on their pupils. Moreover, there is little evidence about the channels through which the impact takes

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[9] Walford (1990: 44-59) provides a review of earlier mainly non-formal studies.
[10] See also HEFCE (2005) which updates and reconfirms these results, for students graduating in the early 2000s.

effect and none at all about how the impact and the channels may have changed as the schools have been modernised.

3   Data and Initial Descriptive Analysis

Data

The main data sources we use are two British cohort studies, the National Child Development Study (NCDS), a cohort of individuals born in a week of March 1958, and the British Cohort Study (BCS), a similarly structured cohort born in a week of April 1970. Information is gathered about these cohort members and their immediate families at ages 7, 11, 16, 33 and 42 for NCDS, and at ages 5, 10, 16, 30 and 34 for BCS. The design of these surveys allows analysis of a host of comparable characteristics before and after the major educational choices made throughout a child‟s life. For the dependent variable used in our earnings analysis, we use information at age 33 (NCDS) in 1991 and age 34 (BCS) in 2004, where employees provide information on their usual pay, pay period and number of hours worked. From this we have derived a figure of gross hourly earnings.[11] We also look at educational attainment as an outcome of interest, considering whether NCDS and BCS cohort members obtain a degree by age 23 (in 1981 and 1993 respectively).

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[11] There is significant attrition and the useable number of observations is considerable smaller than the 17000 or so in the original samples. We have run validation checks to ensure that there are no significant biases introduced in terms of the characteristics identified in the Birth Sweep, which by definition is representative.

One of the main benefits of using the NCDS and BCS is that it allows us to consider a rich set of pre-school treatment characteristics, both cognitive and non-cognitive. On the former, we look at a range of cognitive tests taken by the cohort members.[12] On the latter, non-cognitive attributes of the child are observed in the first sweep, where the mother is asked to describe the child's characteristics through a series of 20 questions. We place these questions into two categories similar to the Rutter Scales (Blanden et al., 2008) for externalising behaviour such as: temper tantrums, hyper-activity, fights often; and for internalising behaviour including: sleeping problems, being a solitary child, biting of nails and experiencing headaches. This information is then combined into two scales using principal component analysis and finally we ensured that the relationships between these responses and the behavioural scales were the same across cohorts.

Initial descriptive analysis

Table 1 shows some initial descriptive statistics on the average log real earnings and degree acquisition of private and state educated individuals from the NCDS and BCS for all cohort members and separately by gender, together with cross-cohort changes. The latter show the change over time in the private/state earnings and education differential. These changes move strongly in favour of the privately educated in all cases. For example, for all cohort members the private/state earnings differential rises significantly from .22 log points to .34

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[12] We drew upon a range of similar tests the cohort members undertook, omitting tests that only one of the cohorts experienced. In the first sweep standardised scores on vocabulary tests and Harris Figure drawing exercises were used. Age 11/10 cognitive skills were derived from standardising reading comprehension, and maths scores, as well as word and pattern recognition matrices. Although reading based tests were undertaken at age 16, the NCDS used a comprehension based test and the BCS used a vocabulary base (this was the same test as aged 11 and so there was a lot of clustering near the top of the distribution). In its place we used English and Maths exam results taken at age 16, using two scales from 0-5, with 5 being an A grade or Grade 1, for O-levels and GCEs respectively.

log points, a rise of .12. Similarly, the proportion getting a degree rises from .25 higher for private versus state up to .39 higher, corresponding to a 14 percentage point relative improvement. Sharp rises in both private/state earnings and degree acquisition differentials are seen for both men and women, with the cross-cohort change in the earnings differential increasing by more for women (.16 as compared to .08) but the degree acquisition differential increasing by more for men (.16 as compared to .12).

4   Empirical Findings

Empirical modelling approach

We begin by considering cross-cohort changes in the statistical associations between economic and educational outcomes and private (versus state) school attendance.   In a general way, we can represent a statistical model for log earnings E of individual i in cohort c as follows:

$$E_{ic} = \alpha_1^c + \beta_1^c P_{ic} + \delta_1^c X_{ic} + \varepsilon_{1ic} \tag{1}$$

where P is a binary indicator of private school attendance, X contains a set of control variables and ε is an error term.

In (1) the cohort-specific private/state school earnings gap is the estimated coefficient $\hat{\beta}_1^c$. We model changes over time for our two cohorts and test the null hypothesis of no

temporal change, $\hat{\beta}_1^{NCDS} = \hat{\beta}_1^{BCS}$. We thus present estimates of the change over time,

$\Delta\hat{\beta}_1 = \hat{\beta}_1^{BCS} - \hat{\beta}_1^{NCDS}$.

We also estimate an analogous model for degree acquisition, D, as:

$$D_{ic} = \alpha_2^c + \beta_2^c P_{ic} + \delta_2^c X_{ic} + \varepsilon_{2ic} \qquad (2)$$

where the change over time in the private/state school degree gap is $\Delta\hat{\beta}_2 = \hat{\beta}_2^{BCS} - \hat{\beta}_2^{NCDS}$.

Finally, we are interested in how much of the changing earnings differential accruing to private schools can be explained by changes in degree acquisition. To do so we control for degree acquisition in (1) as

$$E_{ic} = \alpha_3^c + \beta_3^c P_{ic} + \delta_3^c X_{ic} + \theta_3^c D_{ic} + \varepsilon_{3ic} \qquad (3)$$

and calculate the change in the earnings differential conditional upon degree acquisition as

$\Delta\hat{\beta}_3 = \hat{\beta}_3^{BCS} - \hat{\beta}_3^{NCDS}$. Thus the share of the overall change $\Delta\hat{\beta}_1$ attributable to changes in degree acquisition is $(\Delta\hat{\beta}_1 - \Delta\hat{\beta}_3)/\Delta\hat{\beta}_1$.

Cross-cohort changes in private/state earnings differentials

Table 2 shows estimates of cross-cohort changes in the private/state wage differential from three models. The first shows the raw gaps (as per Table 1) with no controls (except for the pooled sample which now includes a gender dummy), the second shows estimates from regressions conditioning upon family background measures (detailed in the notes to the Table), the third additionally includes early age test scores and the fourth adds the early age non-cognitive, or behavioural, variables. It is evident that, in the cross-sectional cohort models, the estimated private/state wage differentials fall on the inclusion of the controls

but, importantly, they fall by very much the same kind of magnitude in both cohorts. This leaves the cross-cohort change essentially unchanged on their inclusion. In the full specifications, the private/state earnings differential rises by a statistically significant .13 log points for all cohort members, and by .11 and .18 log points for men and women respectively.

We have also cross-validated these findings (to the extent we can on a comparable basis) with data from the British Household Panel Survey. Appendix Table A1 and A2 show estimates analogous to Tables 1 and 2 for birth cohorts born before and after 1960 from the BHPS (there are only two regression specifications in Table A2 as the BHPS data is not as rich as the cohort data and does not include test score information). Reassuringly, the pattern of results in the BHPS Tables very much confirm the findings from the cohorts and the magnitude of the estimated premia are close. In the regression specification conditioning on the same family background variables as the Table 2 middle specification, the private/state wage earnings differential rises by .09 log points for all individuals, and by .06 and .12 for men and women respectively.

Cross-cohort changes in private/state degree acquisition differentials

Table 3 shows analogous models with degree acquisition by age 23 as the dependent variable of interest. There are clear shifts in favour of the privately educated that occur over time. In the full regression model there is a strongly significant rise in the private/state degree acquisition proportion of .17. Increases are similar (and statistically significant) for men and women at .18 and .15. Table A3 in the Appendix shows the same degree

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acquisition equations for BHPS data and, again, a very similar set of results very much corroborates the cross-cohort comparison of Table 3.

The explanatory role of changes in degree acquisition in changes in earnings differentials

The analysis to date shows that earnings and educational attainment differentials have moved sharply over time in favour of privately educated versus state educated individuals. It is natural to ask how much of the rise in the earnings differential can be explained by increased education. Table 4 shows a crude test of this by directly including highest educational qualification in the Table 2 earnings equations. For all cohort members the .13 rise from the full specification from Table 2 falls to .06. Thus just over half (= [.13 - .06]/.13) of the rise in the earnings differential can be attributed to differentially increased education. The size of the education contribution from this naïve test is similar for men and women when considered separately.

5   Discussion and Interpretation

The empirical results of the previous section make it clear that earnings and educational attainment have improved at a faster rate for privately educated versus state educated British individuals. So far this has been considered in isolation, but the findings have wider relevance and also require some careful interpretation as to their meaning. This is what we

consider in this section, starting by linking the findings to the literatures on wage inequality and social mobility, and then offering some discussion of how the findings should be interpreted.

Connections to changing wage inequality

Wage inequality (i.e. the gap between the highest and lowest paid in society) has risen very markedly in Britain since the late 1970s (see the recent analysis of four decades worth of data in Machin, 2010). While the decade by decade evolution of wage gaps between the rich and the poor have been different, a significant aspect of the inequality rise has been the importance of changes in the wage returns to education (Katz and Autor, 1999; Machin and Van Reenen, 2008). Indeed, the common perception is that education has become more important as a determinant of labour market outcomes and that, as the average return to education has risen, so has the variance of returns.[13] Despite this, there is not much evidence that connects information on schools attended to increased heterogeneity of wage returns.

As private/state earnings and education differentials have widened out at the same time as rising wage inequality, the findings we report suggest that type of school attended is likely to have been a factor at play. This is both because of more rapid education acquisition and rising relative wages for privately educated individuals in the labour market.

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[13] Indeed, evidence exists showing more variation in returns to observable indicators like degree subject/college major (Machin and Puhani, 2003), to college quality (Black and Smith, 2006; Hussain, McNally and Telhaj, 2009) and tilts in the wage structure by years of education (Lemieux, 2008; Angrist et al., 2006; Green and Zhu, 2010).

Connections to changes in social mobility

On changing social mobility, one can see that the predominant economic and social position of private school graduands can be seen alongside evidence of persistent class separation in Britain (Goldthorpe and McKnight, 2004) and the period of decreased social mobility (Blanden et al, 2004) that accompanied the general educational expansion of the last quarter century. Argument over whether private education restricts mobility and inculcates privilege, or whether it merely reflects the existing inequality, dates back at least to the early 19th century (Rae, 1981). Indeed, the presence of a significant earnings premium attached to private school attendance underpins the argument that private schools strengthen privilege, and tends to reinforce across generations the already existent inequalities.

In the economic literature the extent of intergenerational income mobility is typically measured by the coefficient β in the following statistical regression for log earnings of children (when of adult age), and parents:

$$E_i^{child} = \beta E_i^{parents} + e_i \qquad (4)$$

Evidence from Britain based upon a cross-cohort comparison shows that β has risen, implying a fall in intergenerational mobility (Blanden et al, 2004). A literature exists which tries to explore the reasons why (see Blanden and Machin, 2008) and it is straightforward to decompose a change in β over time into earnings returns to given characteristics and the connection between such characteristics and parental earnings. To see this, consider the following two life cycle stages:

Stage 1, the relationship between earlier age/childhood factors, Z, and parental earnings:

$$Z_i = \theta E_i^{\text{parents}} + u_i \tag{5a}$$

Stage 2, the relationship between child earnings (as an adult) and these earlier age factors

$$E_i^{\text{child}} = \lambda Z_i + v_i \tag{5b}$$

Here θ measures the sensitivity of Z to parental earnings and λ the income „returns"
to Z, (u_i and v_i are error terms). Substituting stage 1 into stage 2 yields the
intergenerational function $E_i^{\text{child}} = \theta\lambda E_i^{\text{parents}} + \omega_i$, making it evident that $\beta = \lambda\theta$.

To be more concrete for our interest, Z can be thought of as measuring private/state
education (the variable P above), so that θ measures the sensitivity of private/state
education to parental income (stylistically „how much more likely children from rich
backgrounds are likely to be privately educated") and λ the earnings differential between
private and state education („how much more the privately educated earn").

We have already demonstrated a significant rise in λ. What about θ? We consider this in
Table 5 where we report cross-cohort changes in the sensitivity of private versus state
school attendance to family income. It is evident from all specifications that people from
richer backgrounds are significantly more likely to attend private school. Importantly,
however, the empirical association with income is constant over time. Thus, on the
private/state school angle, falling social mobility is more connected to rising private/state
earnings differentials.

Changing sorting and selection

One obvious issue that arises in point-in-time cross-sectional studies that estimate the private/state school earnings differential is a concern that either potentially high- earning or potentially low-earning individuals may select or sort themselves into private school.[14] To the extent that either is the case, this would bias estimates of the earnings gap between privately and state educated individuals.

Our analysis is different because the main interest is changes through time. Thus only if any cross-sectional bias due to sorting/selection changes over time would our estimates of the cross-cohort increase in the differential be biased. The richness of our cohort data, however, helps us a lot here to (at least partly) appraise this issue. We can first see whether private versus state school attendance differs on the usual kinds of observables that people are able to look at. One example of this has already been considered in Table 5 where the association with parental income is reasonably stable across cohorts.

However, there are many more typically unobservable variables available in our cohort data that may result in individuals being differentially sorted into private school. Therefore one strong point in our favour is our ability to include a lot of these prior controls as observables, and we can consider many more than in most studies. We thus have looked at the constancy (or otherwise) of associations between private school attendance and a range of variables that can be consistently defined across the NCDS and BCS cohorts. To be more specific, we have considered the following groups of variables:

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[14] The common perception is of children from high income backgrounds differentially sorting into private schooling, though of course it is possible that some parents may choose private to compensate for perceived problems (academic or non-academic) with their children.

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i) parental income;

ii) demographic characteristics of children and their parents - these are the regression controls contained in the X-vector in equations (1) to (3), detailed in the notes to Tables 2 to 4;

iii) early-age cognitive test scores;

iv) early-age non-cognitive skills;

The richness of these variables is an advantage over many of studies since we do have variables that are usually thought of as unobservables (e.g. like the non-cognitive measures available in the data). If these show similar cross-cohort associations with private school attendance then it may be plausible that other variables that could cause differential sorting may also do so.[15]

Table 6 provides tests of cross-cohort constancy of the estimated coefficients for the sets of variables in i) to iv) above. Of course, within each cohort the factors contained in groups i) to iv) are important predictors of private versus state school attendance as the significant p-values in columns (1) and (2) of the Table show. However, and importantly for arguments about differential sorting, the pattern shown in column (3) is striking in that private school attendance seems to be correlated with these factors in very much the same way across cohorts. All the p-values in column (3) show we cannot reject the null hypothesis of cross-cohort neutrality in the associations between these groups of variables and attendance at private school. Thus these factors do not cause any bias in the cross-cohort changes we

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[15] This is not unlike the Altonji, Elder and Taber (2005) argument on sorting on observables and unobservables for US catholic schools, where they try to say how much bias due to unobservables would be needed to offset their estimated effect of catholic schooling on test scores. As already noted, however, we are able to model a number of the unobservables usually thought to matter.

report. It would need to be some other factor to start giving concerns that the rise in the estimated private state earnings and education differentials may not be accurate. Even here, given the size and significance of the rising private/state school wage differential, such sorting bias would need to be large to overturn the temporal increase in the earnings advantage accruing to private school attendance.

Estimates of the net return for parents

To obtain the increased earnings benefits from private school attendance, pupils" families had to pay fees. A key question to ask is: did they get good value? While it is impossible to provide a definitive answer to this question with available data, one can deduce an 'order of magnitude' estimate for the average net return. Taking the private-school-educated respondents in the BCS cohort, the average annual day fee was £1,500 (and the average boarding fee £2,700) in 1980 prices. With an assumed 10-year private-school period, and allowing for alternative cost reductions, this equates roughly to £43,000 for day students (£75,000 for boarders) at 2000 prices. At this point in their lives our estimate (a 20% premium) implies approximately an additional £5,000 extra pay received in 2000. While this premium might alter over time it would extend into pension receipts. Using this figure as a rough estimate of the annual gains over the course of a long post-school lifetime gives an internal rate of return of approximately 13% (7%).

The estimates of the net return and the premium, however, are also subject to a few caveats. Perhaps most importantly, the transformation of private schools changed considerably the experience of children at private schools. Vastly improved facilities for diverse sporting and

cultural activities raised the quality of the experience over previous eras. These benefits, which are widely known to be superior to those available in state schools, net out part of the cost of private school investments. The estimated average net rate of return, 7-13%, is thus likely to be an underestimate.

6   Conclusions

Despite its relatively small size, the private school sector plays a prominent role in British society. A good understanding of the magnitude and source of the private school premium and any trends over time is important from a public policy perspective. However, for various reasons it seems that this subject has been almost entirely under-researched. In this paper we provide a striking set of findings showing that earnings and education differentials have risen significantly over time for privately educated versus state educated individuals.

The implications of these findings are as follows. On average those paying for private education in the 1970s and beyond were getting good value for their money. Above the fact that private school pupils were spending their school lives enjoying facilities normally far better than those available in state schools, these pupils benefited through improved pay later in life, and the financial return is broadly comparable (and probably higher) than returns on other capital.

It is also apparent that the chief means of delivering the labour market return is through the better academic qualifications that are delivered by private schools using their rising resources. If academic achievements are, therefore, to be a target for government policy, emulation of the private schools would appear to be a policy worth considering. Nevertheless the exclusiveness of the private schools is also shown in the fact that the sector has not expanded beyond its roughly 7% of the total pupil base for many decades. Our findings also imply that many others could have benefited from the boost given by the resources available in private schooling, but did not do so. Since selection into the schools, despite some bursaries and the Assisted Places Scheme, is primarily based on families" ability to pay, and given the substantial returns achieved, it is hard to escape the conclusion that private schools during the period under examination also served to reproduce inequalities in British society.[16]

Finally, it is worth noting that the NCDS/BCS cross-cohort comparison will not have captured the more recent period of inflation-beating rises in school fees that occurred in the recent decade. Therefore, the changes we have examined in this paper only cover the start of a period of long-term transformation of the private school sector fuelled by rising resources. There is an ongoing research need here, to examine whether very recent private school graduands are getting still larger premiums to match the rising fees. We think that research into these private returns should also be part of a broader plan for generating a better understanding of the role of private schools in Britain, including their external effects on other schools and within the labour market, with concomitant implications for both education and taxation policies.

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[16] See Walford (1991: 103-121) for a balanced consideration of arguments for and against private schools in the light of contemporaneous evidence.

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Figure 1: The Relative Quantity of Private Education, England 1964-2006
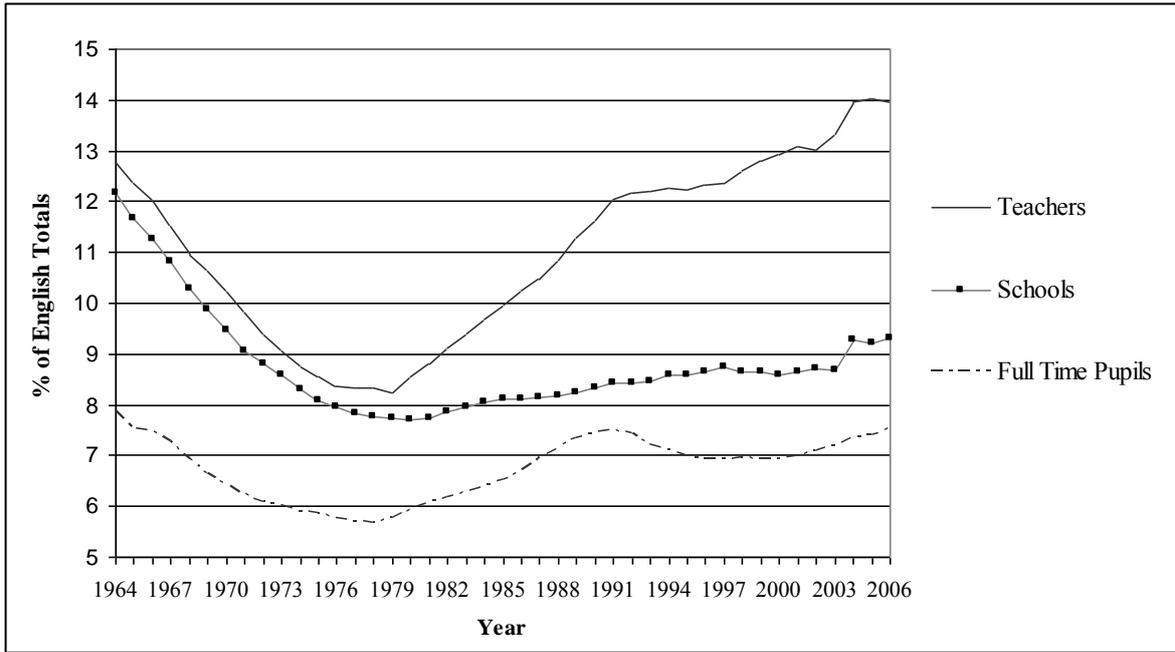
Notes: Source - DSCF 2007; i) Full Time Pupils Only; ii) State Sector Includes; Primary, Secondary, Nursery & Special Schools; iii) Includes both the full-time and the full-time equivalent of part-time teachers; iv) From 1971 onwards, state sector only includes qualified teachers; v) Independent Sector includes Direct Grant Grammar Schools up to and including 1980; vi) From 1990 Independent Sector includes City Technology Colleges; vii) From 2004 Independent Sector includes City Academies.

Figure 2: The Price of Private Education.
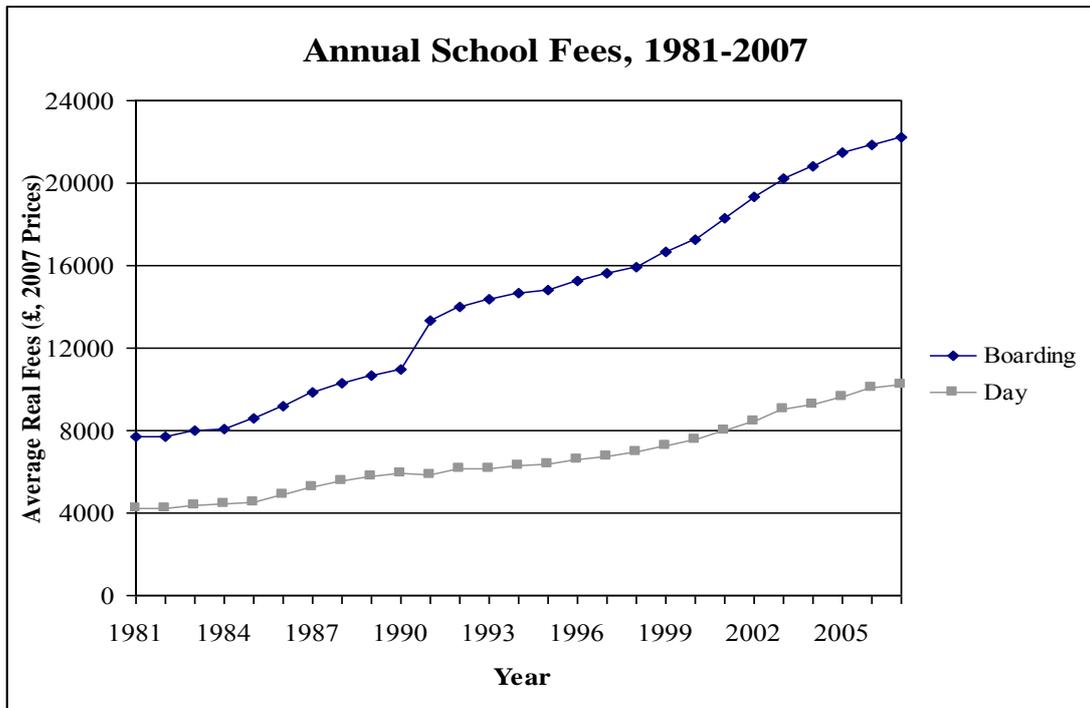
Notes: Source – Independent Schools Council Census Data, 1982-2008; Authors" calculations; RPI, ONS 2006; Prior to 1992 the average fee is not weighted by school size.

Figure 3: The Pupil-Teacher Ratio, England, 1964-2006.
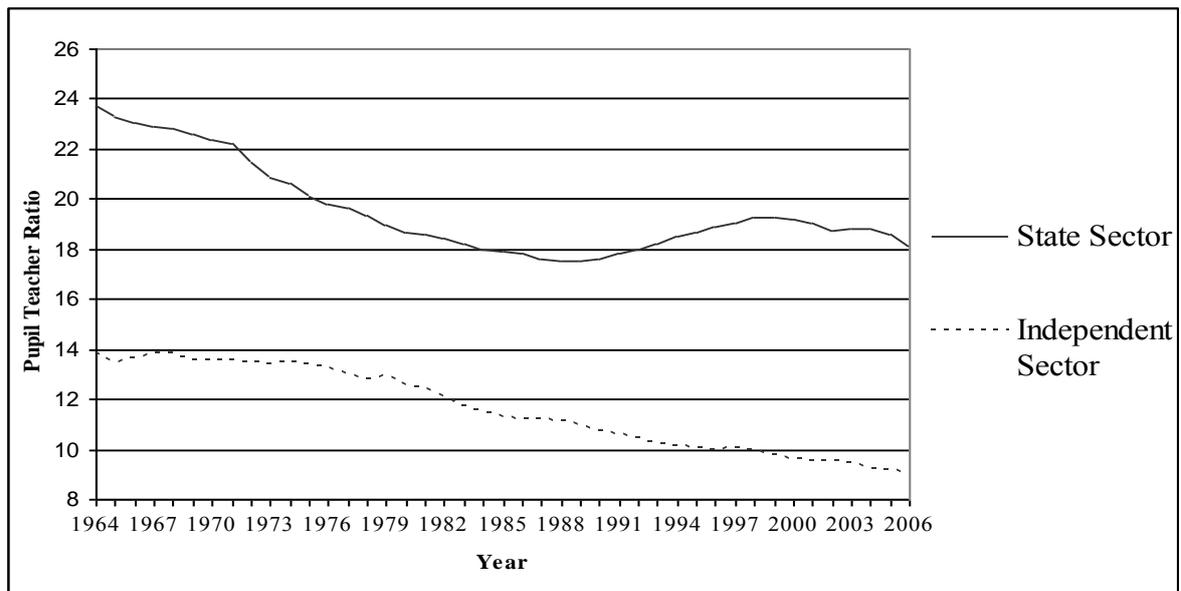
Notes: i) Full Time Pupils Only; ii) State Sector Includes; Primary, Secondary, Nursery & Special Schools; iii) Includes both the full-time and the full-time equivalent of part-time teachers; iv) From 1971 onwards, state sector only includes qualified teachers; v) Private Sector includes Direct Grant Grammar Schools up to and including 1980; vi) From 1990 Private Sector includes City Technology Colleges; vii) From 2004 Private Sector includes City Academies.

Figure 4: Applications and Acceptances to Oxbridge from Private Schools
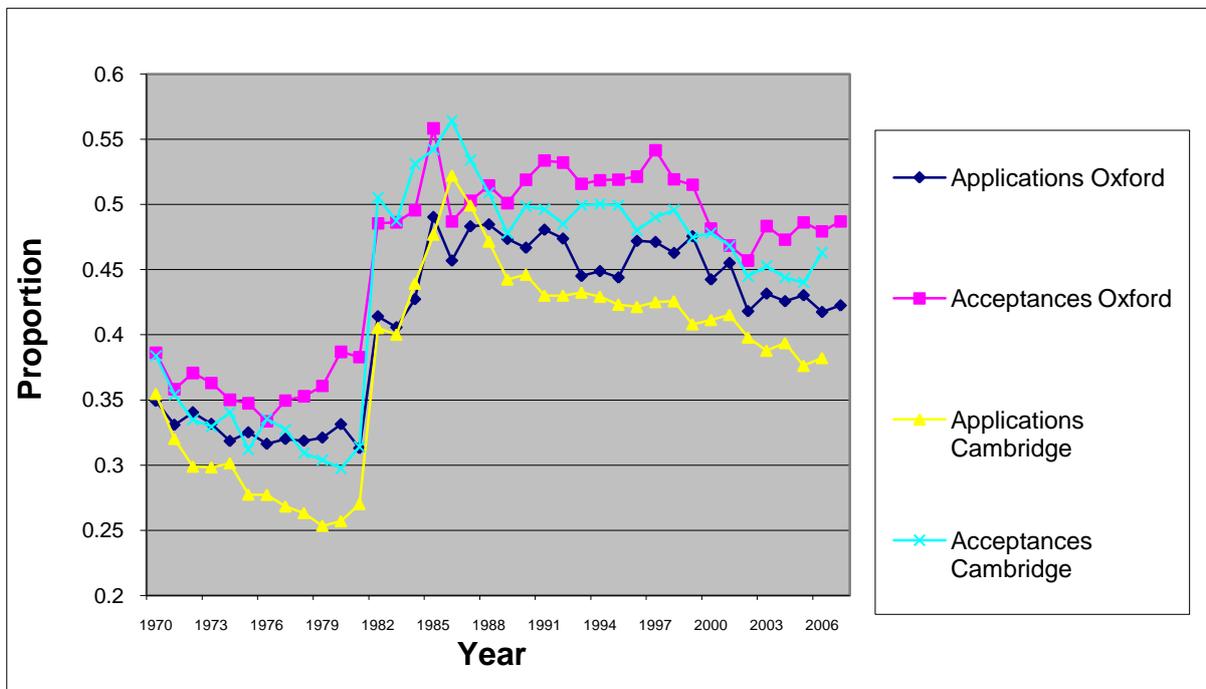
Source: Oxford and Cambridge Admissions Offices.

Table 1: Descriptive Statistics

	NCDS Cohort [Earnings in 1991, age 33; Degree Acquisition in 1981, age 23]			BCS Cohort [Earnings in 2004, age 34; Degree Acquisition in 1993, age 23]			Cross-Cohort Change
	Private	State	Private/State Differential (Standard Error)	Private	State	Private/State Differential (Standard Error)	Change in Private/State Differential (Standard Error)
A. All							
Log Real Earnings	2.385	2.162	0.223 (0.035)	2.650	2.306	0.344 (0.041)	0.121 (0.054)
Degree	0.413	0.163	0.250 (0.027)	0.586	0.192	0.393 (0.033)	0.144 (0.042)
B. Men							
Log Real Earnings	2.535	2.305	0.230 (0.056)	2.729	2.416	0.313 (0.056)	0.083 (0.069)
Degree	0.442	0.167	0.275 (0.036)	0.625	0.186	0.439 (0.045)	0.164 (0.057)
C. Women							
Log Real Earnings	2.203	1.976	0.227 (0.051)	2.562	2.176	0.386 (0.059)	0.159 (0.078)
Degree	0.376	0.157	0.219 (0.039)	0.542	0.201	0.341 (0.048)	0.124 (0.062)

Notes: Standard errors in parentheses. Sample sizes: All, NCDS 4,869; Men, NCDS 2,742; Women, NCDS 2,127; All, BCS 4,778; Men, BCS 2,573; Women, BCS 2,111.

Table 2: Earnings Differentials (Private Versus State School)

	No Controls			Additionally Include Family Background			Additionally Include Early Age Test Scores			Additionally Include Early Age Non-Cognitive Measures		
	NCDS, 1991	BCS, 2004	Cross-Cohort Change	NCDS, 1991	BCS, 2004	Cross-Cohort Change	NCDS, 1991	BCS, 2004	Cross-Cohort Change	NCDS, 1991	BCS, 2004	Cross-Cohort Change
A. All												
Private	.228	.348	.120	.078	.202	.124	.070	.197	.127	.072	.201	.129
School	(.034)	(.039)	(.052)	(.035)	(.039)	(.052)	(.034)	(.039)	(.051)	(.034)	(.039)	(.051)
B. Men												
Private	.230	.313	.083	.083	.170	.087	.075	.177	.102	.077	.184	.107
School	(.044)	(.053)	(.069)	(.045)	(.053)	(.070)	(.045)	(.053)	(.069)	(.045)	(.053)	(.069)
C. Women												
Private	.227	.386	.159	.074	.261	.187	.064	.246	.182	.065	.244	.179
School	(.052)	(.059)	(.078)	(.053)	(.058)	(.078)	(.052)	(.058)	(.077)	(.052)	(.058)	(.077)

Notes: Standard errors in parentheses. Sample sizes: All, NCDS 4,869; Men, NCDS 2,742; Women, NCDS 2,127; All, BCS 4,778; Men, BCS 2,573; Women, BCS 2,111. The No Controls specification for All includes a gender dummy. Family background variables: dummy for the south-east region, age natural parents left school, dummies for natural parents being present, and being a UK national along with current age and social status. A non-white dummy for cohort member is included along with number of siblings and birth order index (see Booth and Kee 2009). Non cognitive test scores: Internalising and Externalising behaviour generated by principal component analysis for the following characteristics; Internalising- headaches, sleeping problems, eating problems, wetting bed, worries a lot, unhappy, sucks thumb, bites nails, fearful, unliked, solitary; Externalising – Temper tantrums, highly active, fidgets, destroys belongings, fights, irritable, cannot settle.

Table 3: Degree Acquisition (Private Versus State School, Linear Probability)

	No Controls			Additionally Include Family Background			Additionally Include Early Age Test Scores			Additionally Include Early Age Non-Cognitive Measures		
	NCDS, 1991	BCS, 2004	Cross-Cohort Change	NCDS, 1991	BCS, 2004	Cross-Cohort Change	NCDS, 1991	BCS, 2004	Cross-Cohort Change	NCDS, 1991	BCS, 2004	Cross-Cohort Change
A. All												
Private School	.250	.393	.143	.061	.226	.165	.055	.222	.167	.057	.225	.168
	(.028)	(.033)	(.042)	(.028)	(.032)	(.041)	(.027)	(.031)	(.041)	(.027)	(.031)	(.041)
B. Men												
Private School	.275	.439	.164	.088	.260	.172	.082	.259	.177	.084	.267	.183
	(.037)	(.045)	(.057)	(.037)	(.043)	(.057)	(.037)	(.043)	(.056)	(.037)	(.043)	(.056)
C. Women												
Private School	.219	.341	.122	.026	.188	.162	.021	0.177	.156	.022	.176	.154
	(.039)	(.048)	(.062)	(.041)	(.047)	(.061)	(.041)	(.046)	(0.06)	(.040)	(.046)	(.06)

Notes: As for Table 2.

**Table 4: Earnings Differentials (Private Versus State School)
Controlling For Highest Qualification**

	Full Specification From Table 2 (Including Family Background, Early Age Test Scores and Early Age Non-Cognitive Measures)			Additionally Control For Highest Qualification		
	NCDS, 1991	BCS, 2004	Cross-Cohort Change	NCDS, 1991	BCS, 2004	Cross-Cohort Change
A. All						
Private School	.072 (.034)	.201 (.039)	.129 (.051)	.042 (.032)	.102 (.037)	.060 (.049)
B.Men						
Private School	.077 (.045)	.184 (.053)	.107 (.069)	.039 (.043)	.084 (.050)	.045 (.066)
C. Women						
Private School	.065 (.052)	.244 (.057)	.179 (.077)	.043 (.049)	.146 (.054)	.103 (.072)

Notes: As for Tables 2 and 3.

**Table 5: Private School Attendance and Standardised Family Income
(Linear Probability)**

	NCDS	BCS	Cross-Cohort Change
A. All			
Log(Family Income)	0.017 (0.003)	0.025 (0.003)	0.007 (0.004)
B. Men			
Log(Family Income)	0.015 (0.004)	0.023 (0.004)	0.008 (0.006)
C. Women			
Log(Family Income)	0.02 (0.005)	0.027 (0.004)	0.007 (0.006)

Notes: Standard errors in parentheses. Sample sizes: All, NCDS 4,869; Men, NCDS 2,742; Women, NCDS 2,127; All, BCS 4,780; Men, BCS 2,573; Women, BCS 2,111. Family income measured at age 16.

Table 6: Cross-Cohort Differences in the Determinants of Private School Attendance
(P-Vales of Joint Significance of Variable Sets)

	NCDS	BCS	Cross-Cohort Change
A. All			
Parental income	0.000	0.000	0.108
Demographic characteristics of children and parents	0.000	0.000	0.116
Cognitive Test Scores	0.000	0.002	0.897
Non Cognitive Test Scores	0.231	0.636	0.861
B. Men			
Parental income	0.000	0.000	0.177
Demographic characteristics of children and parents	0.000	0.000	0.107
Cognitive Test Scores	0.000	0.103	0.611
Non Cognitive Test Scores	0.157	0.723	0.322
C. Women			
Parental income	0.000	0.000	0.361
Demographic characteristics of children and parents	0.000	0.000	0.340
Cognitive Test Scores	0.073	0.003	0.562
Non Cognitive Test Scores	0.770	0.407	0.694

Notes: Demographic characteristics of children and parents includes: birth order index and dummies for non UK father/mother, natural father/mother, ethnicity, parental social status, live in the South East. Cognitive Test Scores includes information on reading and figure drawing. Non Cognitive Test Scores includes scales for externalising and internalising behaviour.

Appendix

Table A1: Descriptive Statistics BHPS

	BHPS Pre-1960 Cohorts (Mean Age = 48.7)			BHPS Post-1960 Cohorts (Mean Age = 33.4)			Cross-Cohort Change
	Private	State	Private/State Differential (Standard Error)	Private	State	Private/State Differential (Standard Error)	Change in Private/State Differential (Standard Error)
A. All							
Log Real Earnings	2.233	2.079	0.154 (0.038)	2.411	2.122	0.289 (0.035)	0.135 (0.052)
Degree	0.395	0.136	0.259 (0.034)	0.618	0.201	0.417 (0.039)	0.159 (0.052)
B. Men							
Log Real Earnings	2.377	2.198	0.179 (0.055)	2.461	2.202	0.259 (0.046)	0.080 (0.072)
Degree	0.379	0.149	0.230 (0.048)	0.599	0.201	0.398 (0.053)	0.168 (0.071)
C. Women							
Log Real Earnings	2.089	1.951	0.138 (0.048)	2.336	2.045	0.287 (0.055)	0.148 (0.072)
Degree	0.4115	0.123	0.288 (0.048)	0.647	0.201	0.446 (0.055)	0.158 (0.073)

Notes: Robust standard errors in parentheses. Sample sizes: All, pre-1960 32,593; Men, pre-1960 16,915; Women, pre-1960 15,678; All, post-1960 30,875; Men, post-1960 14,865; Women, post-1960 16,010.

Table A2: Earnings Differentials (Private Versus State School) BHPS

	No Controls			Additionally Include Family Background		
	BHPS Pre-1960	BHPS Post-1960	Cross-Cohort Change	BHPS Pre-1960	BHPS Post-1960	Cross-Cohort Change
A. All						
Private School	.159 (.037)	.270 (.035)	.111 (.051)	.099 (.037)	.188 (.035)	.089 (.051)
B. Men						
Private School	.179 (.055)	.259 (.046)	.080 (.072)	.116 (.056)	.172 (.044)	.056 (.071)
C. Women						
Private School	.139 (.048)	.287 (.055)	.148 (.073)	.081 (.049)	.204 (.057)	.123 (.076)

Notes: Robust standard errors in parentheses. Sample sizes: All, pre-1960 32,593; Men, pre-1960 16,915; Women, pre-1960 15,678; All, post-1960 30,875; Men, post-1960 14,865; Women, post-1960 16,010. The No Controls specification for All includes a gender dummy. Family background variables: dummy for the south-east region, dummies for father having degree, further education qualification, some qualification (omitted category: no qualification) an indicator for living in non-intact families, mother˝s age when respondent was born, number of sibling, and birth order index (as in Booth and Kee, 2009). We also controlled for age and age squared of the respondent.

Table A3: Degree Acquisition (Private Versus State School) BHPS

	No Controls			Additionally Include Family Background		
	BHPS Pre-1960	BHPS Post-1960	Cross-Cohort Change	BHPS Pre-1960	BHPS Post-1960	Cross-Cohort Change
A. All						
Private School	.259 (.034)	.417 (.039)	.158 (.052)	.173 (.033)	.290 (.039)	.117 (.051)
B. Men						
Private School	.230 (.048)	.398 (.053)	.168 (.071)	.149 (.045)	.285 (.053)	.136 (.069)
C. Women						
Private School	.288 (.048)	.446 (.055)	.158 (.073)	.198 (.048)	.300 (.055)	.102 (.073)

Notes: As for Table A2.