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Private Schooling, Educational Transitions, and Early Labour Market Outcomes: Evidence from Three Anglophone Countries

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Abstract

This article considers the extent to which private-state school differences in post-secondary outcomes can be explained by family background, secondary school achievement, or neither of the above. We find that privately educated children's more advantaged family backgrounds and higher levels of school achievement are the main reasons why this group is more likely to enter university and work in professional jobs. However, even after accounting for family background and high school achievement, non-trivial private-state school differences in later lifetime outcomes remain. Empirical evidence is presented for three industrialized nations (Australia, England, and the United States), with broadly similar patterns of association observed within each.

Introduction

The link between family background, school achievement, and labour market outcomes has long been of interest to sociologists (Duncan and Hodge, 1963; Blau and Duncan, 1967; Ishida, Müller and Ridge, 1995; Breen and Goldthorpe, 2001; Breen and Jonsson, 2007). Indeed, many believe that education, and the school system in particular, is the key mechanism by which social advantage is transmitted across generations (Ganzeboom, Treiman and Ultee, 1991; Breen and Jonsson, 2005). It was once hoped that providing universal primary and secondary education would weaken the link between socio-economic position and educational attainment, equalizing opportunities among young people from different family backgrounds (Brown, 2013). Yet, as Lucas (2001) notes, affluent families will always find ways to provide educational advantages to their offspring, so that their high social position is carried forward into the next generation. In other words, socio-economically advantaged families seek out *qualitative* advantages within the schooling system, so that their children can continue to win the education race.

Private education is a prominent example. Not only is it expensive (Dearden, Ryan and Sibieta, 2011), restricting access to only the most affluent families, but the particular environment within private schools may also alienate children (and families) from outside the highest social groups (Bourdieu, 1974, 1977; Sullivan, 2002). It is also well-known that privately educated children are more likely to enter university (Sullivan *et al.*, 2014), attend a prestigious post-secondary institution (Boliver, 2013; Chowdry *et al.*, 2013), and obtain a professional job (Macmillan, Tyler and Vignoles, 2015;

McKnight, 2015; Jerrim, Chmielewski and Parker, 2015) than their state-educated peers. Thus, private education seems to offer many of the advantages affluent parents look to provide. Together, this makes private schooling an attractive option for families trying to ensure their high social status is transmitted to the next generation.

But are there really long-run benefits of attending a private school? Or is this simply a myth, whereby private education is merely proxying the effect of these children's more advantaged socio-economic backgrounds (i.e. are we really just observing social selection)? Previous evidence on this matter is mixed. Some studies have suggested that, after conditioning on socio-economic status (SES), there is little impact of private education on children's academic achievement (e.g. OECD, 2011). Yet others have argued that non-trivial differences between state and privately educated pupils remain (e.g. Macmillan, Tyler and Vignoles, 2015)—particularly when it comes to longer-term outcomes (e.g. final level of educational attainment and entry into professional jobs).

Relatedly, if there is indeed an association between private schooling and later educational and occupational outcomes, what is the driving force? Is it that private school pupils develop higher skills (and gain better qualifications) during compulsory education than their state-educated peers, meaning they then gain access to the top universities and the most prestigious jobs? Or is the private-state school gap less to do with academic credentials, and more owing to other factors, such as their different career aspirations, educational choices, and the social networks they (and their parents) form?

We explore this issue in this article, decomposing the link between private education and post-secondary school outcomes into 'social sorting', 'through high school education', and 'residual' components. These refer to children from affluent backgrounds disproportionately attending private schools ('social sorting'), the higher scholastic performance demonstrated by privately educated children during secondary school ('through high school education'), and that other factors may explain privately educated children's success in their later educational and occupational careers (e.g. children's risk aversion, information, aspirations, and expectations). The private-state school gap is separated into these components across three English-speaking countries (Australia, England, and the United States) for both educational and early labour market outcomes. This includes entry into university, access to a high-status post-secondary institution, and employment in a professional job. Our goal is to develop a better understanding of the private-state school gap, and the extent to which similar patterns hold across these three Anglophone countries. Although our analysis refers to associations only, and does not reveal the causal impact of private education, it nevertheless provides important new insight into the different post-secondary outcomes of children who attended private and state schools.

Decompositions of the Private-state School Gap

There is a long tradition in sociology of decomposing associations between key background variables and later outcomes into different components. One such example from the status attainment literature is the 'Origin-Education-Destination' triangle (for a review of this literature, see Breen and Jonsson 2005), where social class mobility is divided into the part that can be explained by differences in individuals' educational attainment ('indirect' effect) and the part that cannot ('direct' effects). Boudon (1974) is another example, this time from the sociology of education literature, where post-secondary school transitions are divided into so-called 'primary' (academic achievement) and 'secondary' (choice/behavioural) effects. We apply a similar logic in this article to the private-state school gap in outcomes. Specifically, after measuring the gross association between private education and a series of post-secondary school destinations, we decompose this into what we label the 'through high school education' and 'residual' components.

Our decision to decompose the private-state school gap is based on the following observations. First, private schooling is likely to lead to higher levels of academic performance and final school grades—over and above the impact of family background (i.e. there will be an 'indirect' association between private schooling and later outcomes via higher attainment during secondary school). Second, there are likely to be significant 'residual' associations between private school attendance and post-secondary outcomes, owing to private schoolchildren making different choices. For instance, they will have different peer groups with different social norms, where there is likely to be a strong expectation of entering and completing university. They are also likely to develop different subjective views on the costs and benefits of higher education (through their schools, their teachers, and their peers) and may hold different career aspirations (e.g. to become a doctor or a lawyer) where advanced qualifications are needed. Likewise, private schoolchildren may be more willing to migrate to advance their career, or to take a 'risky' job to gain a foothold in a profession. Similarly, these groups are

likely to differ in their social networks (Macmillan, Tyler and Vignoles, 2015), ability to rely on parental support while searching for a job, and hold different types of information about the pros and cons of different careers (Hooley, Matheson and Watts, 2014). There are hence numerous reasons why one might anticipate there to be 'residual' impacts of private education on young people's educational and occupational outcomes, which work through channels other than their superior academic achievement at high school.

However, before estimating the contribution of these 'through high school education' and 'residual' components, one needs to take into account that part of the private-state school gap is likely due to children from the highest social classes being disproportionately represented within private schools. In this article, we label this as the 'social sorting' effect. Our interest is in decomposing the private school advantage, to discover the relative contribution of social background, high school achievement, and other 'residual' factors.

The existing literature indicates that private-state school differences are indeed likely to be formed of these three components. For instance, Boliver (2013) found private schoolchildren in England were less likely to enter a high status university than their state school peers (odds ratio = 0.29), even once family background differences were taken into account. Moreover, although this could partly be explained by differences in high school achievement (odds ratio = 0.58), a substantial private-state school gap remained. Macmillan, Tyler and Vignoles (2015) reached a similar conclusion for labour market outcomes. Specifically, privately educated children in England were 10 percentage points more likely to be working in a professional job in their early twenties than those who attended state school. This difference remained substantial (6 percentage points) even after socio-economic background and school achievement measures were controlled. In Australia, Vella (1999) found private schoolchildren were more likely to graduate from high school, obtain a university qualification, and demonstrate superior performance in the labour market. However, Cardak and Ryan (2009) found private schooling only influenced university entrance through superior high school achievement. Finally, Falsey and Heynes (1984) found private schoolchildren in the United States were significantly more likely to enrol in a 4-year college. This held true for both the catholic and non-catholic sectors, and remained even after differences in SES and high school achievement were taken into account.

Nevertheless, existing evidence on long-run private school effects remains relatively limited. Indeed, there are few studies that systematically investigate the role of the 'through high school education', 'residual', and 'social sorting' components in explaining the private-state school differential. Indeed, even fewer do this for a range of educational and labour market outcomes. Moreover, the existing literature tends to focus on a single country in isolation, with limited generalizability and cross-cultural replication of results. Consequently, with these limitations in mind, this article attempts to answer the following research questions:

RQ1: In Australia, England, and the United States, how much more likely are private school children to enter university, access a top university, obtain a bachelor's degree, and work in a professional job than their state-educated peers?

RQ2: To what extent are these differences due to family background ('social sorting' effects), higher secondary school achievement ('through high school achievement' component), or neither of the above ('residual' component)?

RQ3: Are the magnitudes of the 'social sorting', 'through high school achievement', and 'residual' components similar across Australia, England, and the United States?

By answering these questions, we make a number of contributions to the existing literature. Although previous work has investigated private-state school differences (e.g. Boliver, 2013; Macmillan, Tyler and Vignoles, 2015), this is, to our knowledge, the first study to explicitly decompose this into the 'social sorting', 'through high school education', and 'residual' components. Moreover, we consider multiple important lifetime outcomes, including access to university, attendance at a high status post-secondary institution, completion of a bachelor's degree, and entry into a professional job. Finally, most existing work has considered a single country in isolation. In contrast, we present empirical evidence for three industrialized nations, providing an important opportunity to replicate and establish generalizability of the results.

Private Education in Australia, England, and the United States

Our research questions are investigated across Australia, England, and the United States. By replicating our analysis across these countries, we start to provide some comparative analysis on how the association between private education and later outcomes varies across

different societies. Moreover, by conducting a comparative analysis, we greatly improve the external validity (i.e. generalizability) of our results. These particular countries have been chosen for four reasons. First, they share important similarities in terms of language, culture, politics, economic development, and having a mainly public schooling system (with a minor private component). This makes these countries natural comparators. Second, there is a growing literature comparing educational inequalities across these countries (Washbrook *et al.*, 2012; Bradbury *et al.*, 2015; Jerrim and Vignoles, 2015) to which this article directly contributes. Third, there are notable differences in the size, cost, and structure of their private education sectors, as detailed below. It is therefore interesting to consider whether, despite these differences, similar associations between private education and post-secondary outcomes can be observed. Finally, each has a high-quality youth cohort study. Together, these contain some of the best information on private education and post-secondary outcomes available across the industrialized world.

Throughout this article, private schools in England are defined as fee-paying, independent institutions that are free of many rules and regulations applied to state-schools. This definition excludes 'academy' schools. In Australia, a clear distinction is typically made between three school types (state, private-catholic, and private independent), with there being substantial differences in tuition fees, resources, and pupil composition (Ryan and Sibieta, 2011). We thus allow for this distinction throughout our analysis. Private schools in the United States are defined as those whose facilities and funding are not provided by the government (federal, state, or local).[1] The majority (80 per cent) of the private school population in the United States are studying within a religious institution (Broughman, 2013; Table 1).

Table 1 compares key characteristics of private schools across these countries. A greater proportion of children attend a private independent school in Australia (17 per cent in private independent schools and 21 per cent in private-catholic schools) than England (7 per cent) and the United States (8 per cent). Average annual fees are also lower in Australia (£4,400) than the United States (£8,800) and England (£9,500), both in absolute value and relative to average wages. Private schools in Australia are also less socially selective (as one would expect, given the higher proportion of children taught in such schools); the average SES of pupils is lower than in England and the United States, with more children from immigrant backgrounds. Finally, although Table 1 suggests that total learning time of privately educated pupils is similar across countries, there are some differences in school environment. Specifically, independent schools in Australia suffer more noise and disruption, while those in the United States have the best pupil–teacher relationships. Yet, despite these differences, outcomes for private school pupils across the three countries are quite similar. Age 15 cognitive test scores (as measured by the Programme for International Student Assessment - PISA) are around the same level, with little obvious variation in pupils' attitudes. Specifically, in all three countries, around 85 per cent of pupils agreed that education had built their confidence, with around 40 per cent strongly agreeing that their school had taught them skills that will be useful in the workplace.

The above provides important context to the private education sectors across the three countries. Despite there being non-trivial differences, institutional foundations are still likely to be strong enough for insightful comparisons to be made. For instance, one might hypothesize that lower fees and less selection in Australia may lead to fewer long-run benefits of private schooling than in England and the United States. Alternatively, given the similarity of age 15 cognitive PISA scores, the 'residual' association between private schooling and later outcomes may turn out to be quite similar across countries, once this factor has been taken into account.

Unfortunately, our capacity to explore such issues (and therefore to fully address our third research question) is limited, owing to challenges with the data currently available. In particular, the small size of the private education sector means formally testing for cross-country variation is difficult, owing to insufficient statistical power. Moreover, our use of country-specific data sets, detailed in the following section, means certain variables will be measured across countries in different ways (e.g. children's high school grades). Yet, despite these challenges, progress towards answering our research questions can still be made. Specifically, by estimating the same broad set of statistical models within each of the three countries, one can gain some insight into whether similar patterns of results do seem to hold. Our cross-national analysis thus serves two purposes. First, it will help us establish the generalizability of our findings for Research Questions 1 and 2. Second, it provides a first attempt towards answering Research Question 3 (while appreciating that, owing to data limitations, some uncertainty regarding our conclusions will remain). We therefore argue that the comparative element of this work represents an important step forward in the literature, providing the best possible evidence on

Table 1. Characteristics of private education across countries

	AUS (ind)	AUS (cath)	ENG	United States
General				
Percent of children who attend private school	17	21	7	8
Average day fee (2015 prices converted into British £)	£4,400	£1,700	£9,500	£8,800
Ratio (average fee / average wages)	0.13	0.05	0.29	0.24
Pupil-teacher ratio	10.4–1	12.7–1	9.2–1	11–1
Average school size	513	436	523	283
Private school pupil characteristics				
At least one parent holds a degree (per cent)	63	45	61	76
Immigrants (per cent)	26	20	18	15
Single-parent households (per cent)	13	15	13	10
SES index (standardized)	0.68	0.32	0.83	0.92
Private school environment				
Teachers' provide extra help (agree/strongly agree)	90 per cent	88 per cent	91 per cent	96 per cent
Teachers' interested in well-being (agree/strongly agree)	85 per cent	79 per cent	86 per cent	90 per cent
Noise and disruption disturbs lessons	28 per cent	37 per cent	10 per cent	16 per cent
Student–staff relations (standardized index)	0.07	−0.13	−0.12	0.41
Average learning time per week (minutes)				
English	3 hr 51 min	3 hr 53 min	3 hr 36 min	3 hr 57 min
Mathematics	3 hr 57 min	3 hr 57 min	3 hr 31 min	3 hr 51 min
Science	3 hr 46 min	3 hr 31 min	5 hr 1 min	3 hr 47 min
Private school pupil attitudes				
School given them confidence (agree/strongly agree)	84 per cent	85 per cent	83 per cent	84 per cent
School taught things useful in a job (strongly agree)	44 per cent	44 per cent	38 per cent	47 per cent
Attitudes towards school (standardized index)	0.07	0.06	0.04	0.25
Private school pupils achievement				
Average PISA reading score	553	531	551	565
Average PISA mathematics score	548	527	541	541
Average PISA science score	566	539	581	563

Note: Authors' calculations drawing on the following sources: PISA 2009 international database, Ryan and Sibieta (2011), National Center for Education Statistics, Independent School Council of Australia, and Independent Schools Council England. Fees converted into real (2015) amounts, and then into pound sterling at current exchange rates. Further details on all calculations available from authors on request.

private-state school differences across these countries, given the data currently available.

Methodology

We define the raw (unadjusted) relationship between private schooling and each outcome as the 'gross association'. This is estimated separately for each country (and each outcome) using a binary-response regression model:

$$O_i = \alpha + \beta_1.P_j + \phi_1.X_i + \varepsilon_{ij} \quad (1)$$

Where:

O_i = The outcome variable of interest (e.g. enter university by age 20 years)
P_j = A binary indicator of whether the respondent attended a private school (0 = no; 1 = yes)
X_i = A vector of basic control variables (e.g. gender and ethnicity)
ε_{ij} = Random error term
i = Respondent i
j = School j

The parameter of interest is β_1 – the overall difference in the outcome between children who attended private and state schools.

In this article, β_1 is the sum of the 'social sorting', 'through high school education', and 'residual' components. These are defined as follows:

'Social sorting' = The portion of the private-state school difference owing to more affluent families disproportionately sending their children to private schools.

'Through high school education' component = The portion of the private-state school gap owing to differences in grades and qualifications obtained in secondary school (*net* of the influence of family background).

'Residual' component = The portion of the private-state school gap that cannot be attributed to either family background or higher levels of scholastic achievement.

To estimate the 'social sorting' component, a second binary response model is specified:

$$O_i = \alpha + \beta_2.P_j + \phi_2.X_i + \varphi_2.F_i + \varepsilon_{ij} \quad (2)$$

Where:

F_i = A vector of family background controls (e.g. parental education and social class)

The 'social sorting' component is then estimated as $(\beta_1 - \beta_2)$, the extent to which the private-state school gap can be explained by the disproportionate representation of children from affluent family backgrounds within such schools.

The parameter β_2 then captures private-state school differences, net of the role of family background. This can then further be decomposed into 'through high school attainment' and 'residual' effects via a third regression model:

$$O_i = \alpha + \beta_3.P_j + \phi_3.X_i + \varphi_3.F_i + \gamma_3.G_i + \varepsilon_{ij} \quad (3)$$

Where:

G_i = The grades and qualifications young people obtain by the end of secondary school

The 'through high school education' component is calculated as $(\beta_2 - \beta_3)$; it is the extent to which remaining private-state school differences can be explained by higher levels of secondary school achievement. In contrast, the 'residual' component is captured by β_3—reflecting private-state school gaps that cannot be attributed to privately educated children's more affluent family background and higher levels of scholastic performance. It thus captures the extent to which private schoolchildren go on to obtain higher levels of education and better jobs than their state school peers, even when their qualifications are the same.

Binary response models (1) to (3) can be estimated using either probit/logit regression or a Linear Probability Model (LPM; Ordinary Least Squares regression with a 0/1 outcome). As noted by Mood (2010), each has advantages and disadvantages. Although probit/logit models are commonly estimated with a binary dependant variable, a now extensive sociological literature highlights the challenges with comparing results across nested models (Allison, 1999; Mood, 2010; Karlson, Holm and Breen, 2012). Specifically, any change in parameter estimates could be owing to either 'confounding' or 'rescaling', with only the former of substantive interest. This is an important limitation, given our aim of decomposing β_1 into social sorting, 'through high school education', and 'residual' components. LPMs do not encounter the same problem, and provide unbiased and consistent estimates of the average effect of each variable (Mood, 2010: p. 78; Wooldridge, 2002: p. 454). They also have the advantage of being simple to interpret, with parameter estimates directly capturing marginal effects (probability differences). In contrast, their main limitations are that (i) standard errors will be incorrect owing to heteroscedasticity and (ii) a linear functional form is imposed (unlike logit/probit, which allows for a non-linear relationship in the tails of the distribution, and constrains predicted probabilities between 0 and 1).

Given the above, LPM estimates will be presented in the main text, owing to their conceptual and practical advantages in statistical decompositions, and ease of interpretation. (Heteroscedasticity-robust standard errors are reported to overcome the first problem listed above). In Appendix A, we test the robustness of results to using 'adjusted' logit estimates following the methodology of Karlson, Holm and Breen (2012).[2]

Data

Three nationally representative data sets are analysed:

Australia: The Longitudinal Study of Australian Youth 2003 (LSAY);

England: The Longitudinal Study of Young People in England 2004 (LSYPE);

United States: The Educational Longitudinal Study 2002 (ELS).

Further information on each survey is provided in Table 2. To account for attrition, survey weights are applied throughout the analysis. In each survey, high school is the primary sampling unit, with all reported standard errors clustered at this level. Descriptive statistics can be found in Table 3.

Family Background

Parental education and social class (parental occupation) are used to control for socio-economic background. Unfortunately, we cannot include household income in our analysis, as this information is not available for Australia. (The impact this has upon our results is considered in Supplementary Appendix B. The 'sorting effect' is likely to be *underestimated* by around

Table 2. A summary of the data sets used

	Australia	England	United States
Data set	LSAY 2003	LSYPE 2004	ELS 2002
Initial population	15-year-olds	8th grade	High school sophomores
How sampled	Schools selected probability proportional to size (PPS). Pupils randomly selected within	Schools selected PPS. Pupils randomly selected within.	Schools selected PPS. Pupils randomly selected within
Ages data available	15–25	15–20	16, 18, 20, and 26
Year respondents turned 20	2007	2010	2006
Sample size Wave 1	10,370	15,770	15,362
Sample size age 20	6,074	8,494	14,011
Sample size age 25/26	3,741	N/A	13,132
Response weights	Yes	Yes	Yes

Table 3. Descriptive statistics

	Australia		England		United States	
	Age 20	Age 26	Age 20	Age 26	Age 20	Age 26
School type						
State school (per cent)	62	62	93	–	92	92
Private school (per cent)	17	17	7	–	8	8
Catholic school (per cent)	21	21	–	–	–	–
Gender						
Male (per cent)	50	50	49	–	50	49
Female (per cent)	50	50	51	–	50	51
Parental education						
Below high school (per cent)	16	16	18	–	6	6
High school (per cent)	30	31	45	–	21	21
Some college (per cent)	14	14	17	–	35	35
Bachelor degree (per cent)	40	40	20	–	38	38
Enter university age 20						
Yes (per cent)	42	45	40	–	43	45
Enter 'high status' university						
Yes (per cent)	12	13	9	–	13	14
Obtain bachelor degree						
Yes (per cent)	–	42	–	–	–	32
Professional job age 26						
Yes (per cent)	–	35	–	–	–	32
Observations	6,074	3,741	8,494	–	14,011	13,132

Note: Authors' calculations using the ELS, LSAY, and LSYPE data sets. Figures reported only for observations with data available.

10–15 per cent, while the 'through high school education' and 'residual' components are likely to be overestimated by up to 15 per cent.)

Parental education has been recorded in terms of national qualifications. We have converted this information into International Standard Classification of Education (ISCED) levels within each country. The following four groups are formed:

Less than high school = ISCED 0–2
High school only = ISCED 3
College below bachelor degree = ISCED 4–5b
Bachelor degree and higher = ISCED 5a/6

Social class is defined using a seven-class Erickson-Goldthorpe-Portocarero (EGP) schema (Erikson, Goldthorpe and Portocarero, 1979).[3] As per Erikson (1984) and Morgan, Spiller and Todd (2013) the 'highest' (most prestigious) occupation of the child's mother and father is used.

Academic Achievement in High School

Each data set contains information on course grades and other academic achievement measures towards the end of high school. The US data includes age 15 PISA test scores, grade point averages (grades 9 through 12), and age 18 cognitive math scores. The English data contains exam grades at age 16 (General Certificate of Secondary Education and equivalents) and age 18 (A-Levels and equivalents) total points scores. LSAY (Australia) includes age 15 PISA test scores and age 18 'Tertiary Entrance Rank' (a measure based on children's grades that determines university placement). These are the achievement variables ('G' in model 3) used when decomposing private-state school differences into the 'through high school education' and 'residual' components.

Within each country, these measures capture multiple dimensions of academic achievement through to the end of high school. They are, however, limited in terms of cross-national comparability. For instance, in Australia and the United States the high school achievement data includes both cognitive test scores and school grades, while only the latter are available in England. Moreover, if test reliabilities differ across countries, then artificial cross-national differences in the 'sorting', 'through education', and 'residuals' components may be observed. In additional analysis, we have tested the robustness of our results to various alternative model specifications, such as excluding the cognitive test score data from the US and Australian models, and found little change to our substantive results (available from the authors on request). Nevertheless, we remind readers that the availability of different academic achievement measures across countries remains an important limitation of the data, meaning we will only be able to make progress towards (and not definitively answer) Research Question 3.

Outcomes

One labour market and three educational outcomes are considered. These are whether the respondent:

- ever entered a bachelor degree course by age 20;
- ever entered a 'high-status' university by age 20;
- obtained at least a bachelor's degree by age 25/26;
- was working in a 'professional' job at age 25/26.

Note that England is excluded from the latter two analyses, as data are not currently available for the age 25/26 sweep. Our definition of 'high-status' universities follows Jerrim *et al.*, 2015. A self-selected alliance of research-intensive institutions is used in England (the Russell Group[4]) with a similar grouping used in Australia (Group of Eight[5]). Institutions defined as 'highly/more selective' according to the Carnegie classification (a ranking based on entrants SAT/ACT scores) is used in the United States. Approximately 1 in 10 young people access a high status institution in each country according to this definition (Table 3). Finally, a 'professional' job is broadly defined as the top two EGP categories (35 per cent hold such a job in Australia, and 32 per cent in the United States).

Results

Educational Attainment

LPM estimates for university entry are presented in Table 4. (Analogous results using logistic regression can be found in Supplementary Table A1) Model 1 demonstrates that there is a large and statistically significant difference between private and state schoolchildren in all three countries. For instance, children who attended a private school in England are 44 percentage points more likely to enter university by age 20. The analogous figure in the United States is 28 percentage points. In Australia, there are differences between state, private-independent, and private-catholic schools in terms of university entry. Yet, the private-state school gap is notably bigger for the independent (31 percentage points) than for the catholic (18 percentage points) sectors (this difference is statistically significant at conventional levels). These results hence provide a clear and consistent message—privately educated children across these countries are much more likely to enter university than their state school counterparts.

Does this finding continue to hold once children's family background has been taken into account? The answer can be found in Table 4 (Model 2). In each country there is a notable reduction in the parameter estimates, demonstrating that at least part of the private-state school gap is due to social selection. Yet, at the same time, this group remains much more likely to enter university. For instance, conditional on SES, privately educated children in England remain 24 percentage points more likely to make the transition into tertiary education than their state-school peers. This compares with 19 percentage points in the United States, 23 percentage points for independent private school pupils in Australia, and 13 percentage points for their catholic school counterparts. These substantial differences demonstrate how differences between private and state school pupils in university entry cannot simply be attributed to 'social sorting' effects, and that other important factors must be at play.

Table 4. LPM estimates for entry into university by age 20

	Model 1		Model 2		Model 3	
	Beta	SE	Beta	SE	Beta	SE
School type (Ref: State)						
Australia-independent	31.4[a]	3.4	23.2[a]	3.0	5.4[a]	2.3
Australia-catholic	17.9[a]	2.8	13.3[a]	2.6	5.0[a]	1.6
England	44.4[a]	3.5	24.2[a]	3.1	4.7[a]	1.8
United States	28.4[a]	1.1	18.9[a]	1.7	10.2[a]	1.8
Controls						
Gender	√		√		√	
Ethnicity	√		√		√	
Parental education	–		√		√	
Social class	–		√		√	
High school achievement	–		–		√	
High school graduation	–		–		√	

Note: Authors' calculations using the ELS, LSAY, and LSYPE data sets. 'Beta' refers to the difference in the probability of entering university between young people who attended private school and those who did not. 'SE' reports the estimated standard error.

[a]Indicates statistically significant from 0 at the 5 per cent level. The percent of children who enter university (i.e. the average of the outcome variable) is 42 per cent in Australia, 40 per cent in England, and 45 per cent in the United States.

An important example is variation in academic performance at secondary school. Does one continue to find a private-state school gap in university entry even after this has been controlled? Model 3 provides insight into this issue, illustrating the 'residual' association between private schooling and university entry. In all countries, the parameter estimates are again substantially reduced, suggesting superior academic performance at secondary school does indeed go a long way to explaining why privately educated pupils are over-represented at university. However, non-trivial and statistically significant residual associations remain. Moreover, they seem to be somewhat bigger in the United States than the other two countries. For instance, the 'residual' private school component amounts to approximately 5 percentage points in England and Australia (across both the independent and catholic sectors) compared with 10 percentage points in the United States. In other words, private education continues to be linked with entry into university, over and above its role in developing higher levels of scholastic performance in secondary school and the socio-economic background of attendees.

Figure 1 Panel A summarizes these results by demonstrating the proportion of the private-state school gap 'explained' (in a statistical sense) by the 'social sorting', 'through high school education', and 'residual' components. 'Social sorting' accounts for around 40 per cent of the difference between private and state school pupils in England and the United States, and 25 per cent in Australia. However, as Supplementary Appendix B demonstrates, these figures are likely to be lower bounds owing to our lack of control for parental income (particularly in the United States). In comparison, the 'residual' component accounts for 15–20 per cent of the gross association within England and Australia, and up to 30 per cent in the United States. Overall, we therefore conclude that the 'social sorting', 'through high school education', and 'residual' components all contribute to the private-state school gap within these three countries, with broadly similar patterns observed within each.

Table 5 and Figure 1 Panel B provide analogous results for access to a high-status university. In general, similar substantive conclusions emerge. For instance, large unconditional private-state school differences are observed for Model 1, which are substantially reduced once SES (Model 2) and high-school achievement (Model 3) are controlled. Take England as an example. The association between private schooling and high-status university entry drops from 26 percentage points to 13 percentage points once conditioning on SES, and down to 5 percentage points once prior achievement is also controlled. Equivalent figures for the United States are 19, 13, and 9 percentage points, respectively. Interestingly, we do not find a substantial difference between private-catholic and state schools in Australia (at least in terms of 'high status' university entry). Nevertheless, for all other groups/countries, Model 3 again suggests that an important and statistically significant gap between private and state school pupils remain. Furthermore, after conditioning on SES and prior achievement, the magnitude of the private-state school

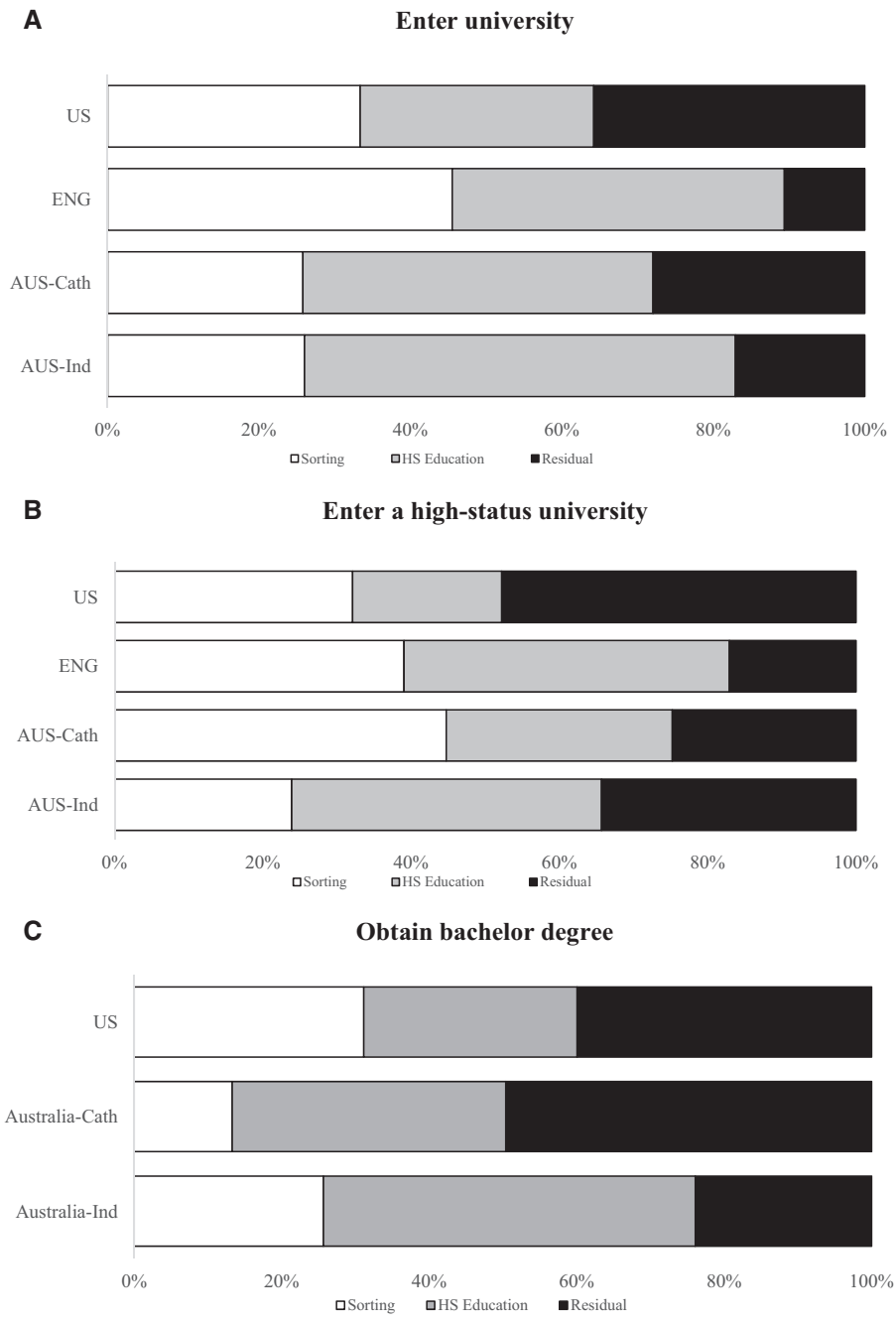

Figure 1. The 'sorting', 'through education', and 'residual' associations between private schooling and post-secondary educational outcomes. (**A**) Enter university; (**B**) Enter a high-status university; (**C**) Obtain bachelor degree.

Note: Figures refer to percentage of total private school effect that is owing to 'social sorting' (white), 'through high school education' (grey), and 'residual' (black) components.

Table 5. LPM estimates for entry into a '*high status*' university by age 20

	Model 1		Model 2		Model 3	
	Beta	SE	Beta	SE	Beta	SE
School type (Ref: State)						
Australia-independent	17.5[a]	3.1	13.3[a]	2.5	6.0[a]	2.0
Australia-catholic	5.3[a]	1.6	2.9	1.6	1.3	1.3
England	26.2[a]	4.0	16.0[a]	3.7	4.5	2.5
United States	18.5[a]	2.5	12.6[a]	2.3	8.8[a]	2.2
Controls						
Gender	√		√		√	
Ethnicity	√		√		√	
Parental education	–		√		√	
Social class	–		√		√	
High school achievement	–		–		√	
High school graduation	–		–		√	

[a]Indicates statistically significant from 0 at the 5 per cent level. The percent of children who enter a 'high status' university (i.e. the average of the outcome variable) is 12 per cent in Australia, 9 per cent in England and 14 per cent in the United States.

Note: Authors' calculations using the ELS, LSAY, and LSYPE data sets. 'Beta' refers to the difference in the probability of entering a '*high status*' university between young people who attended private school and those who did not. 'SE' reports the estimated standard error.

gap is reasonably similar across our three countries of interest.

It is also interesting to draw comparisons across Figure 1 Panel A (university entry) and Panel B (high status university entry). Although the proportion attributed to 'social sorting' is broadly similar for both university entry and elite university entry, the contribution of the 'through high school education' component is notably smaller (and the 'residual' component larger) for the latter. Indeed, the 'residual' is the single biggest component with regards to the United States. Together, this demonstrates how non-academic and non-SES factors have a particularly important role in private school pupils gaining access to leading universities; the 'residual' component is even more relevant here than for entry into higher education in general.

Finally, Table 6 and Figure 1 Panel C turn to completion of a bachelor's degree by age 26. The gross private school association ranges from 21 percentage points for Australian catholic schools to 30 percentage points for Australian independent schools (the analogous figure for the United States is 25 percentage points). This is once more substantially reduced with the inclusion of SES and achievement controls, with the 'residual' component (Model 3 estimates) around 10 percentage points across both countries (and always statistically significant at the 5 per cent level). Again, this highlights that factors beyond SES and high school achievement seem important for private school pupils' prospects of obtaining a tertiary qualification. Figure 1 Panel C further illustrates this point. 'Social sorting' accounts for less than half the private-state school gap in both cases, while the 'residual' accounts for between 25 per cent (Australian-independent) and 50 per cent (Australian-catholic). Thus, just as for university entry, there remains a non-trivial residual association between private education and children's chances of obtaining a bachelor's degree by age 26 years.

Early Labour Market Transitions

Table 7 demonstrates that, within both Australia and the United States, there is a large gross association between private schooling and entry into a professional job (approximately 15 percentage points or more). 'Social sorting' accounts for between one-fifth (catholic schools) and one-quarter (independent schools) of this difference in Australia, and around one-third of the difference in the United States. Nevertheless, private schoolchildren remain 10 (United States) to 12 (Australia) percentage points more likely to be in a professional career at age 25/26 years than their state-educated peers, even after 'social sorting' has been taken into account (see Model 2). Once academic achievement up to age 18 has also been controlled, the private-state school gap falls to 7 percentage points for Australian-catholic schools, 3 percentage points for Australian-independent schools, and 7 percentage points in the United States. The 'through high school education' component therefore accounts for between half (Australian-independent) and a quarter (United States) of the difference observed. Yet, the Model 3A parameter estimates remain non-trivial in both countries, and

Table 6. LPM estimates for bachelor degree attainment by age 26

	Model 1		Model 2		Model 3	
	Beta	SE	Beta	SE	Beta	SE
School type (Ref: State)						
Australia-independent	30.1[a]	3.1	22.4[a]	2.8	7.2[a]	2.6
Australia-catholic	20.8[a]	2.9	18.0[a]	2.8	10.3[a]	2.1
United States	25.3[a]	1.5	17.5[a]	1.3	10.1[a]	1.8
Controls						
Gender	√		√		√	
Ethnicity	√		√		√	
Parental education	–		√		√	
Social class	–		√		√	
High school achievement	–		–		√	
High school graduation	–		–		√	

[a]Indicates statistically significant from 0 at the 5 per cent level. The percent of children who obtain a bachelor degree by age 26 (i.e. the average of the outcome variable) is 46 per cent in Australia and 32 per cent in the United States.

Note: Authors' calculations using the ELS, LSAY, and LSYPE data sets. 'Beta' refers to the difference in the probability of obtaining a bachelor degree by age 26 between young people who attended private school and those who did not. 'SE' reports the estimated standard error.

Table 7. LPM estimates for entry into a professional job

	Model 1		Model 2		Model 3A		Model 3B	
	Beta	SE	Beta	SE	Beta	SE	Beta	SE
School type (Ref: State)								
Australia-independent	17.6[a]	2.4	12.7[a]	2.3	3.4	2.3	0.2	2.1
Australia-catholic	14.5[a]	2.4	12.0[a]	2.3	7.4[a]	2.2	2.6	2.0
United States	14.9[a]	1.4	10.3[a]	1.5	6.6[a]	1.7	3.1[a]	1.3
Controls								
Gender	√		√		√		√	
Ethnicity	√		√		√		√	
Parental education	–		√		√		√	
Social class	–		√		√		√	
High school achievement	–		–		√		√	
High school graduation	–		–		√		√	
Educational attainment age 25	–		–		–		√	
Ever attended elite university	–		–		–		√	

[a]Indicates statistically significant from 0 at the 5 per cent level. The percent of young people working in a professional job at age 26 (i.e. the average of the outcome variable) is 38 per cent in Australia and 32 per cent in the United States.

Note: Authors' calculations using the ELS, LSAY, and LSYPE data sets. 'Beta' refers to the difference in the probability of working in a professional job at age 26 between young people who attended private school and those who did not. 'SE' reports the estimated standard error.

statistically significant on two of three occasions (the exception is Australian-independent schools). Indeed, for both the above, more than a third of the private-state school differential remains unexplained within the 'residual' component. This highlights how factors beyond academic achievement at age 18 are key to differences in early labour market outcomes between private- and state-educated children.

To explore this point further, respondents' final level of educational achievement at age 25 (ranging from no high school credentials to holding a doctoral degree) is included in a supplementary model (Model 3B). The purpose is to examine the extent to which the private-state school gap in Model 3A can be attributed to educational achievement alone (thus limiting the role for other factors, such as the influence of social networks or nepotism in the labour market). We no longer find a statistically significant difference in Australia; differences between state and private schools (both independent and catholic) can be explained by the higher educational

skills and qualifications that these pupils gain. In contrast, the difference remains statistically significant in the United States, where privately educated children are still 3 percentage points more likely to enter professional employment than their state school peers. Hence there is an indication that non-education related factors (e.g. social networks, labour market nepotism) could contribute to the private-state school gap in the labour market—at least in the United States.

Conclusions

The association between private schooling and later lifetime outcomes has long been of interest to sociologists, particularly within the sociology of education and status attainment literatures. Yet, previous work has either considered a limited number of outcomes, or studied a single country in isolation. In contrast, we have provided new evidence on private-state school gaps across multiple outcomes and countries, including a decomposition of the differences observed into 'social sorting', 'through high school education', and 'residual' components. In other words, we have investigated whether the superior outcomes of privately educated children can be explained (in a statistical sense) by their more affluent family background, higher levels of secondary school achievement, or by neither of the above.

Our analysis suggests all three components have an important role within each country, and for most outcomes considered. Less than half of the private-state school differential can typically be attributed to social sorting. Moreover, at least one-fifth of the gap cannot be explained by differences in family background and secondary school achievement alone. In other words, we find consistent evidence of sizeable and statistically significant 'residual' (unexplained) components. Consequently, there is strong evidence of substantial private-state school differences, many of which are not explained by either family background or higher academic credentials acquired during secondary school.

These findings should, of course, be considered in light of the limitations of this study. First, sample sizes for private school pupils are reasonably small. Consequently, our estimates are accompanied by quite wide confidence intervals. Second, although we have presented results for three countries, they are limited in terms of cross-national comparability. Despite the same broad model being estimated within each nation, and the data harmonized as far as possible, differences are likely to remain. Consequently, we have only investigated whether similar broad patterns hold across these countries, rather than formally testing for significant differences in the results. A cross-national longitudinal study, where exactly the same data are collected across a large number of countries, represents the next important step in this line of research. Finally, as emphasized by Morgan *et al.* (2013), our empirical strategy does not reveal the 'causal effect' of private schooling. Rather, it provides a descriptive account of private-state school differences in outcomes, and the extent these can be 'decomposed' (in a statistical sense) by certain characteristics that we observe (family background and secondary school achievement). Further methodological work is therefore needed, before this literature can move beyond estimating conditional associations to establishing causal relationships.

Nevertheless, we argue that our findings still have important implications. Given that both the 'through high school' and 'residual' components are sizeable, policymakers could attempt to reduce either (or both) when trying to equalize opportunities among private and state school pupils. However, we suggest that reducing the through education component is likely to be an expensive and difficult way to proceed. Indeed, given the vast additional resources of private schools (Dearden, Ryan and Sibieta, 2011), it seems unlikely that the secondary school achievement gap will ever be fully reduced. In contrast, ensuring equally well-qualified young people from private and state schools follow similar educational and early career pathways seems a lot more amenable to cost-effective policy action. This may include, for instance, providing more information on the costs and benefits of higher education (and of different careers) to children within state schools. Likewise, it could mean more needs to be done to ensure private school pupils (and their families) cannot use their social networks to gain access to the best universities and top professional jobs. Yet, further research is needed to establish what is driving the 'residual' associations that we observe, before the most appropriate policy action can be put into place.

Notes

1 Note, however, that this definition excludes charter schools, whose funding comes from government sources but have more autonomy in terms of rules and regulations.

2 These authors have developed a methodology that, they argue, can overcome the limitations of logit/probit models in estimating statistical decompositions.

3 We follow Morgan *et al.* (2013) and Marks (2011) in mapping ELS and LSAY occupational data into the EGP schema.

4 See http://www.russellgroup.ac.uk/. Our definition includes only those institutions that were part of the Russell Group before 2010 (when the LSYPE sample generally entered university).
5 http://www.go8.edu.au/

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Supplementary Data

Supplementary data are available at *ESR* online.

References

Allison, P. (1999). Comparing logit and probit coefficients across groups. *Sociological Methods and Research*, **28**, 186–208.

Blau, P. and Duncan, O. (1967). *The American Occupational Structure*. New York: Wiley.

Boliver, V. (2013). How fair is access to more prestigious UK universities?. *The British Journal of Sociology*, **64**, 344–364.

Boudon, R. (1974). *Education, Opportunity, and Social Inequality*. New York: Wiley.

Bourdieu, P. (1974). The school as a conservative force: scholastic and cultural inequalities'. In Eggleston, L. (Ed.), *Contemporary Research in the Sociology of Education*. Methuen: London, pp. 32–46.

Bourdieu, P. (1977). Cultural reproduction and social reproduction. In Karabel, J. and Halsey, A. H. (Eds.), *Power and Ideology in Education*. Oxford: Oxford University Press.

Bradbury, B. *et al*. (2015). *Too Many Children Left Behind: The U.S. Achievement Gap in Comparative Perspective*. New York: Russell Sage Foundation.

Breen, R. and Goldthorpe, J. (2001). Class, mobility and merit: the experience of two British birth cohorts. *European Sociological Review*, **17**, 81–101.

Breen, R. and Jonsson, J. (2005). Inequality of opportunity in comparative perspective. *Annual Review of Sociology*, **31**, 223–243.

Breen, R. and Jonsson, J. (2007). Explaining change in social fluidity: educational equalization and educational expansion in twentieth-century Sweden. *American Journal of Sociology*, **112**, 1775–1810.

Broughman, S. P. and Swaim, N. L. (2013). *Characteristics of Private Schools in the United States: Results From the 2011–12 Private School Universe Survey*. https://nces.ed.gov/pubs2013/2013316.pdf.

Brown, P. (2013). Education, opportunity and the prospects for social mobility. *British Journal of Sociology of Education*, **34**, 678–700.

Cardak, B. and Ryan, C. (2009). Participation in higher education in Australia: equity and access: are equity-based scholarships an answer? *Economic Record*, **85**, 433–448.

Chowdry, H. *et al*. (2013). Widening participation in higher education: analysis using linked administrative data. *Journal of the Royal Statistical Society Series A*, **176**, 431–457.

Dearden, L., Ryan, C. and Sibieta, L. (2011). What determines private school choice? A comparison between the United Kingdom and Australia. *Australian Economic Review*, **44**, 308–320.

Duncan, O. and Hodge, R. (1963). Education and occupational mobility: a regression analysis. *American Journal of Sociology*, **68**, 629–644.

Erikson, R. (1984). Social class of men, women and families. *Sociology*, **18**, 500–514.

Erikson, R., Goldthorpe, J. and Portocarero, L. (1979). Intergenerational class mobility in three Western European Societies: England, France and Sweden. *British Journal of Sociology*, **30**, 1–34.

Falsey, B. and Heyns, B. (1984). The college channel: private and public schools reconsidered. *Sociology of Education*, **57**, 111–122.

Ganzeboom, H., Treiman, D. and Ultee, W. (1991). Comparative intergenerational stratification research: three generations and beyond. *Annual Review of Sociology*, **17**, 277–302.

Hooley, T, Matheson, J. and Watts, A. G. (2014). Advancing ambitions: the role of career guidance in supporting social mobility. *Sutton Trust Report*, available from: http://www.suttontrust.com/wp-content/uploads/2014/10/Advancing-Ambitions-16.10.pdf [accessed 30 March 2015]

Ishida, H., Müller, W. and Ridge, J. (1995). Class origin, class destination, and education: a cross-national study of ten industrial nations. *American Journal of Sociology*, **101**, 145–193.

Jerrim, J., Chmielewski, A. K. and Parker, P. D. (2015). Socioeconomic inequality in access to high-status colleges: A cross-country comparison. *Research in Social Stratification and Mobility*, **42**, 20–32.

Jerrim, J. and Vignoles, A. (2015). University access for disadvantaged children: A comparison across English speaking countries. *Higher Education*, **70**, 903–921.

Karlson, K., Holm, A. and Breen, R. (2012). Comparing regression coefficients between same-sample nested models using logit and probit: a new method. *Sociological Methodology*, **42**, 286–313.

Lucas, S. (2001). Effectively maintained inequality: education transitions, track mobility, and social background effects. *American Journal of Sociology*, **106**, 1642–1690.

Macmillan, L., Tyler, C. and Vignoles, A. (2015). Who gets the top jobs? The role of family background and networks in recent graduates' access to high-status professions. *Journal of Social Policy*, **44**, 487–515.

McKnight, A. (2015). Downward mobility, opportunity hoarding and the glass floor. *Social Mobility and Child Poverty Commission Research Report*, available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/447575/Downward_mobility_opportunity_hoarding_and_the_glass_floor.pdf [accessed 22 September 2015].

Mood, C. (2010). Logistic regression: why we cannot do what we think we can do, and what we can do about it. *European Sociological Review*, **26**, 67–82.

Morgan, S., Spiller, M. and Todd, J. (2013). Class origins, high school graduation, and college entry in the United States. In Jackson, M. (Ed.), *Determined to Succeed Performance versus Choice in Educational Attainment*. Stanford: Stanford University Press. pp. 279–305.

OECD. (2011). Private schools: who benefits. *PISA in Focus 7*, available from: <http://www.oecd.org/pisa/pisaproducts/pisainfocus/48482894.pdf> [accessed 29 April 2015].

Ryan, C. and Sibieta, L. (2011). *Private Schooling in the UK and Australia*. Institute for Fiscal Studies Working Paper, available from: http://www.ifs.org.uk/bns/bn106.pdf [accessed 16 September 2015].

Sullivan, A. (2002). Bourdieu and education: how useful is Bourdieu's theory for researchers?. *The Netherlands' Journal of Social Sciences*, **38**, 144–166.

Sullivan, A. *et al.* (2014). Social origins, school type and higher education destinations. *Oxford Review of Education*, **40**, 739–763.

Vella, F. (1999). Do catholic schools make a difference? Evidence from Australia. *Journal of Human Resources*, **34**, 208–224.

Washbrook, E. *et al.* (2012). The development of young children of immigrants in Australia, Canada, the United Kingdom and the United States. *Child Development*, **83**, 1591–1607.

Wooldridge, J. (2002). *Econometric Analysis of Cross Section and Panel Data*. Cambridge: MIT Press.

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