

Education Research Brief

A Review of Academic Studies of Public and Private School Outcomes in Australia

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April 2015

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Key Points

1. Raw comparisons of student outcomes in public and private schools generally show higher achievement in private schools. However, such comparisons are misleading because public schools enrol the vast proportion of disadvantaged students who, on average, have much lower results than students from higher socio-economic status (SES) families. Fair comparisons of school performance adjust for differences in the social composition of schools and other background factors. Nearly 30 academic studies in Australia have used statistical techniques to do this in the last 15 years.
2. Studies that adjusted for a range of student and school characteristics show no significant differences between the results of students from public, Catholic and Independent schools in national and international tests and in university completion rates. Public school students appear to achieve higher university grades than private school students despite the latter achieving higher university entrance scores. There is mixed evidence for Year 12 completion and workforce earnings.
3. Seven studies of public and private school results on national and international tests in Australia have been published in the last five years. Six of them show no statistically significant differences between the results of public, Catholic and Independent schools. The one exception to this used a flawed measure of school SES that has since been jettisoned by the Australian Curriculum, Assessment and Reporting Authority (ACARA) as unreliable.
4. Three studies of Year 12 completion in recent years show mixed results. One found that students in Catholic and Independent schools are more likely to complete Year 12 than students in public schools. Another found an advantage for Independent schools over public schools but no difference between public and Catholic schools. The third study estimated that the Catholic school effect ranged from slightly negative to slightly positive compared to public schools, depending on different assumptions. These studies adjusted for student SES but did not include a measure of school SES.
5. Six other studies have estimated the impact of attendance at public and private schools on university entrance scores in the last 15 years. Four found a small advantage for Catholic and Independent schools. Two other studies found a small advantage for Independent schools over public schools, but not for Catholic schools. The differences in adjusted scores are very small and may be over-stated because a measure of school SES was not included in any of the analyses.
6. Six studies have analysed the impact of school sector attendance on first year university grades in the last ten years and all found that students from public schools achieved higher grades than students from Catholic and Independent schools.
7. Three studies have suggested that the contrast between the advantage of private school attendance on university entrance scores at the end of Year 12 and the disadvantage in first year university is due to private schools artificially boosting university entrance scores to improve access to university.
8. Three studies have compared university completion rates for students from different sectors. One estimated that the Catholic school effect ranged from slightly negative to

slightly positive compared to public schools depending on assumptions made, while the other two found no significant differences in completion rates between students from public, Catholic and Independent schools.

9. There is mixed evidence from two studies of the effect of school sector attendance on later earnings in the work force. One found a small earnings gap favouring Catholic school students over public school students and the other found no significant difference in weekly earnings between public, Catholic and Independent school students.

Introduction

Raw comparisons of student outcomes in public and private schools generally show higher achievement in private schools. However, such comparisons are misleading because public schools enrol the vast proportion of disadvantaged students who, on average, have much lower results than students from higher socio-economic status (SES) families. Fair comparisons of school performance adjust for differences in the social composition of schools and other background factors.

One way to do this is to compare the results of schools with a similar advantage/disadvantage composition (as measured by the Index of Community Socio-Educational Advantage or ICSEA constructed by the Australian Curriculum, Assessment and Reporting Authority or ACARA). For example, a recent analysis of NAPLAN results showed very similar results in high and medium SES public, Catholic and Independent Public, Catholic and Independent schools while few comparisons were possible in the low SES category because there are very few Catholic and Independent schools of this type [Cobbold 2015].

Analytical statistical techniques can also be used to adjust for differences in the social composition of schools to compare the performance of public, Catholic and private schools. Such analyses assess the contribution of different background factors to observed differences in test results and other outcomes between school sectors in order to isolate the effect of attendance in one sector or another.

Nearly 30 such studies have been undertaken in Australia over the past 15 years or so. This paper reviews the findings of these studies.

Studies of international and national test results

One group of studies has used the results from the OECD's Programme for International Student Assessment (PISA) and the national NAPLAN tests to compare the results of public and private schools in Australia.

The 2012 national PISA report shows that there was no statistically significant difference between the results of public, Catholic and Independent schools in mathematics, reading and science after adjustment is made for student and school socio-economic background [Thomson et.al. 2013: 35, 144, 183]. The report states:

In other words, students in the Catholic or independent school sectors bring with them an advantage from their socioeconomic background that is not as strongly characteristic of students in the government school sector. In previous cycles of PISA, the OECD has noted that the differences between public and private schools disappear once similar adjustments are made in most OECD countries. [35]

The national results from PISA 2009 also showed no difference between public, Catholic and Independent schools [Thomson et.al. 2010].

The PISA studies take into account the effect an individual student's family background or socioeconomic status has on their performance and the effect of composite school socioeconomic background (the so-called peer effect) has on their performance. The school level SES effect arises from different concentrations of students from different SES backgrounds between schools. For example, students from high or low SES backgrounds have lower average results in a predominantly low SES school than in a predominantly high SES school. The results for Australia, and many other countries, indicate that school SES has

a much larger impact on student achievement than individual family SES. For example, 56 per cent of the total variation in mathematics achievement in PISA 2012 was explained by socio-economic differences between schools and six per cent by socio-economic differences between students within schools [Thomson et.al. 2013, Figure 9.7: 279; OECD 2013, Table II.2.9a: 200].

A number of other recent studies have also found little difference in the results of the three sectors after adjusting for differences in SES and other characteristics. These newer studies take advantage of more comprehensive data and modern statistical analysis not available in older studies. One feature of these modern methods is that they take account of the influence of non-measured factors on test results, such as differences in student motivation and aspirations, parental attitudes to education and non-cognitive skills, which may bias the estimated school sector effects.

One of these recent studies analysed data from PISA 2009 in reading, mathematics and science and found no difference between the quality of public and private schools [Mahuteau & Mavromaras 2014]. It found that the main determinant of the higher raw test scores observed in private schools is the higher SES (denoted as ESCS) of students attending these schools.

It is the indirect impact of SES that drives the higher observed scores of the average private school against the lower observed scores of the average public school, and not any intrinsic higher quality in education provision by the private school sector. [3]

...what seems to be driving the (raw data) observation that non-Government schools achieve higher scores than Government ones, is not the result of an inherent higher quality of non-Government schools. It is rather the result of the more privileged high socio economic status students self-selecting into non-Government schools and taking their existing advantage with them to these schools. [16]

The study controlled for a number of student and school characteristics including student and school level SES, Indigenous background, location, school type, time spent on subjects, student/teacher ratio, shortage of qualified teachers, computers per student and absenteeism. After controlling for these variables, it found that students enrolled in Independent schools had significantly lower scores in all subjects than their government schools counterparts while students who attended Catholic schools had significantly lower scores in maths and science and no difference in reading.

This result shows that the observed superior average performances of students in non-government schools should be attributed to factors such as the higher ESCS of the student body, more resources per student, more parental support and/or pressure, and less absenteeism among students, rather than to some intrinsic quality difference between school sectors. [8]

The study also showed that a small part, roughly six to seven per cent, of the total variation in test scores is explained by non-measured factors after controlling for observed student and school effects. This residual effect is interpreted as a measure of school quality including influences such as the learning environment of the school, ability of teachers, leadership, etc.

The study tested for differences in the distribution of school quality across public and private schools and found no statistically significant difference for any of the three subjects. It also tested for differences between public, Catholic and Independent schools. In the case of reading and science, the estimated school quality did not differ significantly between the three school sectors. In the case of maths, public schools performed better than Independent schools while Catholic schools performed slightly better than public and Independent schools. However, the authors warned that these results should be treated with caution

because of the small sample sizes when private schools were split into Catholic and Independent schools.

Another recent study analysed PISA reading and mathematics results since 2003 and found that while Catholic and Independent schools had generated better outcomes than public schools in 2003 this was not the case in 2006 and 2009 [Ryan 2013]. In the later PISA cycles, there was no difference in results between the school sectors. This study controlled for a number of student background and school characteristics including student- and school-level SES, state and sector of the schools, location in cities or regional areas, size of schools. School-level variables included resources, hours of learning in key domains, student-teacher ratios and levels of school autonomy.

Two other recent studies have used data from the Longitudinal Study of Australian Children (LSAC) and NAPLAN tests to compare the results of public and private primary schools. Both studies found no significant difference in results between school sectors after accounting for student background characteristics.

A Queensland University study found no difference in test results between public, Catholic and Independent primary schools after taking account of student background factors that influence school results [Nghiem et.al. 2015]. Indeed, Catholic schools perform worse than public schools on some results. The study's conclusion is emphatic:

We find that sending children to Catholic or other independent primary schools has no significant effect on their cognitive and non-cognitive outcomes...
We thus have evidence now from three continents that the returns to attending private schools are no different to those from attending public schools. [p.55]

The study used data from the first four waves of the LSAC survey which provides comprehensive information about children's cognitive and non-cognitive development and the socio-economic and demographic background of children and their parents. It tracked over 4,000 students between Years three and five.

The cognitive development of children was measured by NAPLAN test data for reading, writing, spelling, grammar and punctuation and numeracy for Years 3 and 5 and the results of three other tests. The LSAC survey also includes data on a number of non-cognitive skills such as emotional development, conduct, hyper activity, relations with peers and social skills.

The study estimated the comparative impact of attendance at public, Catholic and Independent primary schools on the cognitive and non-cognitive results by adjusting for a range of background factors such as family income, education, age, gender, Indigeneity, language spoken at home and birth weight.

The raw scores of Catholic and Independent school students on the NAPLAN and other tests were generally higher than those of public school students. However, the differences disappeared after adjusting for the various background factors. The study found no significant differences between school sectors in NAPLAN test results for Year 3 but Catholic school students achieved significantly lower results than public school students on two other tests on the Matrix Reasoning test and the Peabody Picture Vocabulary Test. Year 5 students from Catholic schools also achieved statistically significantly lower test results than students from public schools in spelling, grammar and numeracy in NAPLAN tests and in the Matrix Reasoning test.

The study also found a small advantage for Independent schools in Year 5 for reading, the Matrix Reasoning and Peabody Picture Vocabulary tests, but the level of statistical significance is low and the magnitudes of the differences were generally modest.

The authors also estimated progress between Year 3 and Year 5. After controlling for the results achieved in Year 3, they found that the NAPLAN test scores for spelling, grammar and numeracy of students in Catholic schools were statistically significantly lower than those in public schools, but were not significantly different for reading and writing. There was no difference in the results of Independent and public schools, with the exception of a slightly higher performance by Independent schools on the Peabody Picture Vocabulary test.

The study also found no statistically significant effects between school sectors on indicators of child behaviour except that students from Catholic schools have less problems interacting with peers than students in public schools.

Moran et.al. [2014] analysed Year 3 and 5 NAPLAN results in reading, writing, spelling, grammar and numeracy of nearly 5000 children in public, Catholic and Independent schools. After controlling for student background characteristics and applying two different statistical techniques it found no statistically significant difference in the results between school sectors.

Overall, no consistent evidence of Catholic or Independent school effects was found. That is, the estimates of several techniques generally indicated no significant difference in academic performance between school sectors once accounting for student background characteristics. These findings challenge existing theories of Private school efficiency. [1]

An exception to the findings of all these studies is Miller & Voon [2012, see also Miller & Voon 2011] which found that average NAPLAN scores in Catholic and Independent schools were higher than in public schools after allowing for differences in school characteristics (school SES, female proportion, size). It found that 36 to 55 per cent of the difference in raw scores between public and Independent schools for Year 3 reading, numeracy, writing, spelling and grammar remained after accounting for school characteristics. In the case of Catholic and public schools, 10 to 54 per cent of the difference in raw scores remained after accounting for differences in school characteristics. The remaining differences between public schools and Catholic and Independent schools were generally smaller for Year 9. Approximately, 50 per cent of the difference in raw scores for Year 3 and about 60 per cent of the difference for Year 9 between public and Independent schools was explained by school characteristics. For the public/Catholic comparison it was 50 per cent in Year 3 and 70 per cent in Year 9.

However, the residual differences favouring Independent and Catholic schools are likely to be over-estimated because it did not account for student/family level SES and the measure of school SES was flawed. The study contained no controls for student and family level characteristics which also influence student results at school. For example, analysis of the PISA results for 2009 and 2012 show that although school SES accounts for a large part of student achievement, student (and family) SES accounts for part of the difference in average test scores between school sectors [Thomson et.al. 2010, 2013]. For example, in mathematics student SES accounted for about 20 per cent of the difference in public and Catholic school results and about 33 per cent of the difference in public and Independent school results. Moreover, average school test scores can disguise considerable differences in the variability of individual student results between schools.

A second reason to consider that the difference between public and private school results is over-estimated in this study is that it was based on NAPLAN results in 2009 when an ABS area-based measure of SES was used to determine school ICSEA values. This meant that the ICSEA values of private schools that drew enrolments from high SES families living in lower SES areas tended to be under-estimated and while the SES of public schools tended to be over-estimated because high SES families resident in their area tend to choose private schools. The study, therefore, failed to fully account for differences in the SES composition of schools. In recognition of such criticisms of its earlier version of ICSEA, ACARA used family level data drawn from school enrolment forms to determine school ICSEA values from 2011 although it continued to use area-based data where direct family-based data was inadequate [ACARA 2012].

Studies of Year 12 outcomes

Several other studies have considered the impact of school sector attendance on school completion and university entrance scores at the end of Year 12.¹

A recent study found that Catholic and Independent school students were more likely to reach Year 12 than public school students after controlling for SES and other factors [Marks 2014]. It found that the odds of students attending Catholic and Independent schools reaching Year 12 were 1.6 and 1.2 times the comparable odds of students attending public schools, after controlling for SES, prior achievement in Year 9 and other school factors. The study used merged data for NAPLAN results and the Victorian Certificate of Education for almost 70,000 Victorian students that were in Year 9 in 2008. The study did not include a measure of school SES which, as noted above, has a significant effect on student outcomes. It is likely that inclusion of school SES would reduce what the study says is a “modest” school sector effect [345].

A previous study by the same author found a positive effect on Year 12 completion by attendance at Independent schools compared to public schools but no difference between Catholic and public schools [Marks 2007b]. This study used data from PISA 2003 and made allowance for school SES. Earlier studies of factors, including attendance at schools in different sectors, affecting Year 12 completion relied on narrower measures of student SES and more narrow tests of literacy and numeracy [Marks 2007b].

Another recent study utilised data from the Longitudinal Survey of Australian Youth (LSAY) 1998 Year 9 cohort to compare public and Catholic school effects on Year 12 completion and university commencement and completion [Cardak & Vecci 2013]. It took account of differences in family background including socio-economic status of families and English speaking or not as well as student motivation and effort. It found that the effects of attending Catholic schools for completing high school ranged between -4.76 and 5.42 per cent. These results imply that the Catholic school effect is at best slightly positive but could be zero or even negative.

The study notes that a major issue in such comparisons is that the positive effects of Catholic school attendance reported above could be biased because students are not randomly enrolled in these schools. Instead, it is likely that either parents or schools or both may be systematically selecting students into Catholic schools which may enhance their education outcomes. It notes that there are several possible sources of selection bias in Catholic school

¹ Studies such as Vella [1999], Le & Miller [2003], Evans [2004] and Kelley [2004] that used data from before the 1990s are not included in this review.

enrolments. It may occur because parents value the religious aspects of Catholic education, perceive that Catholic schools offer stricter discipline or want a lower cost private school alternative than offered by many independent schools. Another possibility is that Catholic schools themselves use formal or informal selection criteria to exclude some students.

The study uses several statistical techniques to try and correct for possible selection bias created by unobserved factors. The results show that the small positive Catholic school effect on school and university outcomes compared to government schools could actually be zero or negative. One approach shows that even a small selection bias could explain much of the positive Catholic school attendance effect on school and university outcome measures. According to the study, the positive effect of Catholic school attendance on outcomes largely depends on there being no selection bias, which is highly unlikely.

The analysis shows that a strong selection bias in Catholic enrolments would mean that secondary school completion and university commencement and completion rates for Catholic school students are 15 to 18 per cent lower than for public school students. However, it is considered that a weaker selection bias is more likely.²

A study of the determinants of year 12 completion and university participation for five cohorts graduating from high school between 1980 and 1998 included the effect of attendance at Catholic and Independent schools compared to public schools [Marks et.al. 2000]. It found significant positive effects of attendance at Catholic and Independent schools on participation in Year 12 and university after controlling for family background. However, there was a very large decline in the advantage pertaining to Independent schools over the period to 1999. There was a large decline in the Catholic school advantage for participation in Year 12 to 1995, but it increased significantly in 1998 and may have been due to differences in survey design for that cohort [Cardak & Vecci 2013: 35]. The Catholic school advantage in university participation fluctuated considerably over the period, but the advantage over public schools in 1999 was similar to that in 1980. Another study also found a large decline in the advantage of Independent schools for completion of Year 12 over the period 1980 to 2001 [Fullarton et.al. 2003], but an advantage of attendance at Catholic and Independent schools remained at the end of the period.

Fullarton et.al. [2003] also found no difference in the likelihood of a Year 12 student from a Catholic or Independent school enrolling in basic, intermediate or advanced level mathematics, in the physical sciences overall, or in physics and chemistry individually compared to a student from a public school. The study adjusted for a range of factors influencing Year 12 outcomes including gender, parental occupational and educational background, parents' country of birth and region (metropolitan, regional, rural and remote).

Other studies have considered the impact of attendance at public and private schools on university entrance scores. One study used the LSAY 2003 cohort to examine university entrance scores of students in public, Catholic and Independent schools [Marks 2009]. After accounting for students SES background, prior achievement (as measured by PISA test scores in Year 9), and student learning environment, it found that Independent school students have the highest entrance scores and that Catholic school students have higher schools than public school students. Students from Independent schools scored on average about 11 points higher

² The robustness of the techniques used to correct for selection on unobservable factors is the subject of some debate. See Li & Dockery 2014, Mahuteau & Mavromaras 2014, Marks 2014.

and Catholic school students scored about 5 points higher than public school students. The raw 11-point difference in scores between Independent and public school students declined to a six-point difference after controlling for prior achievement and socioeconomic background, and the difference between Catholic and public school students declined from five to three points. These differences are quite small and it should be noted that the study did not include a measure of school SES.

A study that analysed the relationship between SES background and university participation also estimated the effects on university entrance scores of attendance in different school sectors and found a small advantage for Catholic and Independent schools [Cardak & Ryan 2009]. The study used data from the LSAY 1995 Year 9 cohort. Once again, using LSAY data meant that no measure of school SES was included in the analysis.

Earlier studies also found only small differences in university entrance scores after taking account of student SES and prior achievement. One study that used data from the LSAY 1995 Year 9 cohort found that a 12-point difference in entrance scores between students attending public and Independent schools was halved when taking into account student SES and achievement in Year 9 tests in literacy and numeracy [Marks et.al. 2001]. For Catholic schools, a difference in raw scores of six points declined only one point when controlling for these two factors. A comparable study using data from the LSAY 1998 Year 9 cohort found that the 11-point difference in scores between students who attended Independent and public schools declined to a seven-point difference when controlling for socio-economic background and prior achievement while the Catholic/public school difference declined from five to three points [Marks 2004]. These studies relied on more limited socio-economic indicators than several more recent studies that have used PISA data.

Another study used LSAY data on three cohorts of students who changed high schools for Years 11 and 12 to assess the impact of differences of unobserved factors (motivation, ambition, etc. as measured by plans to complete Year 12 and attend university, occupational ambitions and attitudes towards homework and teachers) that may bias estimated school sector effects [Ryan 2014]. It estimated how much of the apparent gaps in attitudes and achievement between students who attend different types of schools reflect unobserved differences between students after allowing also for observed student characteristics such as family background and location. The study concluded:

The apparent average gaps in attitudes and achievement between students in public and private schools largely disappear, suggesting that differences in unobserved characteristics contribute substantially to observed differences in student attitudes and achievement between Australian school sectors. [2]

The study analysed the results of literacy and numeracy tests in Year 9 and university entrance scores, as well as attitudes to school, future study and occupational plans, of Year 9 students from the 1995, 1998 and 2009 LSAY cohorts who subsequently moved school sectors against the average results of those who remained in the original sector and those of the sector to which they moved. A small positive effect on university entrance scores was found for those moving to Independent schools for the combined 1995/1998 cohorts.

While the study takes account of observed differences in student background, it did not take account of differences in the social composition of schools which other studies have shown to have a significant effect on average student outcomes. As a result, part of the estimated

effects for unobserved student factors and school sectors may be the result of differences in school SES.

An earlier study that used data for students from the 1995 and 1998 LSAY Year 9 cohorts who were required to change high school because of the unavailability of Years 11 and 12 in their school found that students who attended Independent schools achieved a higher university entrance score than those attending public and Catholic schools [Ryan & Watson 2009]. It found no difference for Catholic and public school students.

However, this study is of limited value. It was based on a very small number of students; in particular, there were only 26 students attending Independent schools compared to 482 public school students and 203 Catholic school students. In addition, there were no controls included for differences in school characteristics such as SES composition, teacher/student ratios, etc. Further, the study noted that differences in important unobservable factors may have influenced its results.

Studies of university outcomes

A number of studies have also analysed the university outcomes of students from public and private schools. The most recent of these found that attendance at private schools does not provide any advantage in terms of academic performance at university [Li & Dockery 2014]. It found that students from public schools performed just as well as students from Catholic and Independent schools in their first year of study at the university. It stated that the findings indicate that higher SES schools artificially inflate their students' university entry scores (for example, by intensive coaching for external exams) and thus improve their access to university. However, they do not perform as well when they have to work more independently at university.

The study linked schools data from My School to first-year undergraduate data from 2011 to 2013 at an unnamed Australian university in order to assess the role of schools' resources, SES and school sectors in determining academic performance at university. It took account of both student-level SES (postcodes obtained from university records and linked to ABS area-based SES indices) and school-level SES obtained from My School. A number of other student and school factors were also taken into account.

Other Australian studies have consistently found that students who attended private schools achieve lower grades at university than those of students who attended public schools.

A study of all full time students enrolled in the Bachelor of Health Science at the University of Western Australia between 2000 and 2005 found that attendance at public schools was one of the factors most strongly associated with successful academic performance in the first year of study [Mills et.al. 2009]. When a range of factors were taken into account, students who attended public secondary schools were found to have higher marks in first year than students who attended Catholic or Independent secondary schools.

Another study of first year students at the University of Western Australia between 2001 and 2004 also found that public school students achieved higher marks than students from either Catholic or Independent schools [Birch & Miller 2007]. The differences were small – the marks of private school students were found to be three percentage points lower than for students from public schools. This estimated impact was equivalent of a change of around three percentiles on the university entrance score. Thus a student who attended a Government

school and achieved a university entrance score of, say, 85 would, on average, do just as well during the first year at university as a student who attended a private school and achieved the higher score of 88.

The study found that the large part of the difference in the marks of public and private school students in first year university courses was because private school students attended a single-sex secondary school. It estimated that it accounted for about two thirds of the penalty in university performance associated with attendance at a private school

The study also found that the negative impact of attending a private school was similar across the distribution of marks. The reduction in university marks associated with attending a private school was -3.8 percentage points for students at the tenth quantile and -2.6 percentage points for students in the ninetieth quantile.

An earlier study by the same authors of first year students at the University of Western Australia in 2001 also found that the type of secondary school attended by students has a significant impact on their grades at university [Birch & Miller 2006]. Students who attended Catholic school were found to have grades three percentage points below that of students from public schools and students from Independent schools had grades four percentage points below public school students. As with the later study, students who attended Catholic or Independent schools have lower grades than their counterparts who attended public schools over the entire distribution of university grades.

These findings are similar to those of several other studies. Win & Miller [2005] found the mean university achievement of first year students from Catholic and Independent schools was less than that for students who had attended public schools. The authors suggested that this may occur because Catholic and Independent schools 'artificially inflate' students' high school leaving grades.

Dobson and Skuja [2005] made the same finding from a study of first year students at Monash University between 2000 and 2003 after controlling for entrance scores. This was true across nearly all entrance score bands. A further result was that students from non-selective public schools had similar university grades as Catholic and Independent school students who scored significantly higher on ENTER scores at school. It also suggested that its finding suggested that private schools inflate university entrance scores.

A study of students who were enrolled in compulsory first-year subjects in 1997 in Monash's Faculty of Business & Economics at three campuses found a significant difference in the results obtained by students from Catholic and Independent schools compared to students from public schools at one campus, after allowing for other variables influencing results [Evans & Farley 1998]. It found no differences in performance at the other two campuses.

Other studies have analysed university participation and completion rates. The study by Cardak & Vecchi [2013] referred to above also found that the effect of Catholic school attendance on university commencement rates compared with public school attendance ranged from -3.47 to 6.23 per cent, after adjusting for and unobserved factors. The estimates for university completion ranged from -4.79 to 7.04 per cent. The range of estimates depended upon assumptions regarding selection on the unobserved factors in attendance at Catholic school.

Marks [2007a] used data from the 1995 LSAY Year 9 cohort to analyse university completion rates amongst students from public, Catholic and Independent schools for courses commenced between 1998 and 2001. Whilst the raw figures showed that Catholic school students had the highest levels of expected course completion (88% for any course) compared to students who attended public (79%) and Independent schools (81%), there was little or no impact of school sector on expected completion rates after taking into account of a range of student background factors and university entrance scores.

A similar finding was obtained by an earlier study of non-completion at university [McMillan 2005]. Students from public schools had the highest raw attrition rate, followed by students from Independent schools and Catholic schools, but the effect of school sector on attrition did not remain statistically significant after controlling for other socio-demographic and educational factors.

Labour market outcomes

Few studies have attempted to determine the effect of school sector attendance on labour market outcomes. One recent study using data from the Household, Income and Labour Dynamics Australia (HILDA) found that during the prime-time of a career, wage rates for Catholic school graduates increase with labour market experience at a greater rate, on average, than wage rates for public school graduates [Jha & Polidano 2013].

The study shows that Catholic school students earn slightly more than public school graduates after accounting for differences in educational qualifications, family background characteristics and religious affiliation. It estimates an adjusted wage growth gap of \$2 per hour in favour of Catholic school students that appears only after 15 years work experience, increases to \$3 per hour after 20 years and then disappears after 25 years. The study offers no explanation for the disappearance of the wage gap.

It estimates the wage gap at 11 per cent of average earnings. Assuming a 40-hour week over the 10 years for which the advantage applies, this would amount to only just over \$50,000. For comparison, lifetime earnings of university graduates are \$1 million, or 70 per cent more than those who did not complete Year 12.

The study attributes the small wage gap to greater prospects of promotion because of assumed superior non-cognitive skills of Catholic school students. This is a highly speculative, unwarranted supposition for which no evidence is presented. It is difficult to see how an advantage in non-cognitive skills only has an effect after 15 years of work and then disappear after 25 years.

The study dismisses school-based social networks as an explanatory factor because it would be expected to benefit early in careers. However, an alternative explanation is that at entry level, the priority is more a matter of getting a desirable job whereas biases in promotion related to the person's school are more likely appear later.

The study suggests that Catholic schools do a better job of developing non-cognitive skills (self-discipline, resilience, persistence, self-motivated learning, etc.) than public schools. However, it presents no evidence of this. On the contrary, the available evidence suggests that attending Catholic and Independent schools does not provide any advantage in the development of non-cognitive skills in children [Nghiem et.al. 2015]. The study also ignores research by the Nobel Laureate, James Heckman, and others showing that the acquisition of

non-cognitive skills is strongly associated with parent background [for example, see Carneiro & Heckman 2003, Cunha et.al. 2006, Heckman & Masterov 2007), Carneiro et.al. 2007]. There is also research evidence that SES is a causal factor in the acquisition of non-cognitive skills by children in Australia [Khanam & Nghiem 2012]. Catholic schools have a much higher proportion of students from high SES backgrounds and a much lower proportion from low SES backgrounds than public schools [Preston 2013].

There is also other evidence that attendance at private schools has no effect on weekly earnings after controlling for the effects of sex, age and level of education [Chesters 2014]. However, the details of the data and methodology used in this study are not published.

Conclusions

There is little substantive evidence to support the widespread perception of superior performance by private schools. In general, the evidence suggests little to no difference between public and private schools across several indicators of school performance when student and school background factors are taken into account.

The weight of evidence from sophisticated statistical studies that take account of a range of family and school factors that influence school test results is that there are no statistically significant differences between public, Catholic and Independent schools. Seven such studies have been carried out in the last five years and six show no difference in results between school sectors. The other study found that average NAPLAN scores in Catholic and Independent schools were higher than in public schools. However, these results are likely to be biased because it did not take account of student/family SES and it used a flawed measure of school SES that has since been jettisoned by ACARA.

Three studies have analysed Year 12 completion in recent years and they show mixed results. One found that students in Catholic and Independent schools are more likely to complete Year 12 than students in public schools. Another found that students in Independent schools are more likely to complete Year 12 than students in public schools but found no difference between public and Catholic schools. The third study compared public and Catholic school effects on Year 12 completion and estimated that the Catholic school effect ranged from slightly negative to slightly positive compared to public schools, depending on different assumptions.

Two studies published in the early 2000s found some advantage of attendance at Catholic and Independent schools for completion of Year 12, but found a large decline in the Independent school advantaged since 1980. One of these studies found no difference in the likelihood of a Year 12 student from a public, Catholic or Independent school enrolling in mathematics and physical science courses.

Four studies have estimated the impact of attendance at public and private schools on university entrance scores in the last 15 years and all found a small advantage for Catholic and Independent schools. The differences in adjusted scores are very small and may be overstated because a measure of school SES was not included in any of the analysis. Two other studies using data for students who changed school for Years 11 and 12 found a small advantage for Independent schools over public schools, but not for Catholic schools.

Six studies have analysed the impact of school sector attendance on first year university grades in the last ten years and all found that students from public schools, on average,

achieved higher grades than students from Catholic and Independent schools. Three studies have compared university completion rates for students from different sectors. One estimated that the Catholic school effect ranged from slightly negative to slightly positive compared to public schools depending on assumptions made, while the other two found no significant differences in completion rates between students from public, Catholic and Independent schools.

Three studies have suggested that the contrast between the advantage of private school attendance on university entrance scores at the end of Year 12 and the disadvantage in first year university is due to private schools inflating university entrance scores.

Only two studies have considered the effect of school sector attendance on later earnings in the work force. One found a small earnings gap favouring Catholic school students over public school students and the other found no significant difference in weekly earnings between public, Catholic and Independent school students.

In summary, there appear to be no significant differences between the results of students from public, Catholic and Independent schools in national and international tests and in university completion rates in Australia. Public school students appear to achieve higher university grades than private school students despite the latter achieving higher university entrance scores. The evidence is mixed for Year 12 completion and workforce earnings.

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