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Author/s:
Haisken-DeNew, J;Polidano, C;Ryan, C

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John Haisken-DeNew
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Working Paper No. 29/17
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Early Academic Outcomes of Funded Children with Disability*

John Haisken-DeNew, Cain Polidano and Chris Ryan
Melbourne Institute: Applied Economic and Social Research
The University of Melbourne

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Melbourne Institute: Applied Economic and Social Research
The University of Melbourne
Victoria 3010 Australia
***Telephone* +61 3 8344 2100**
***Fax* +61 3 8344 2111**
***Email* melb-inst@unimelb.edu.au**
***WWW Address* melbourneinstitute.unimelb.edu.au**

Abstract

People with disability face considerable difficulty participating fully in work and the wider community, due in part to poor schooling outcomes. To enable students with disability to meet their potential, the governments provide extra funding to schools to help them meet their special learning needs. Such funding includes extra funding for meeting diverse student needs under formula-based block grant arrangements, funding for specific programs and funding that is targeted at the individual level. In this study, we take a first-step in examining outcomes from targeted funding, over and above outcomes from other funding sources, in mainstream public schools in Victoria under the Program for Student with Disability (PSD). We use information on disability and child development in the first year of school from the Australian Education and Development Census (AEDC), linked to Year 3 NAPLAN and information on PSD receipt from Year 1 to Year 3. We find that only around 17% of mainstream public-school students with disability who are in the bottom quarter of the state developmentally receive ongoing targeted funding under the PSD between 2012 and 2015. Using multivariate regression and rich administrative student data to control for differences between students with disability who do and do not receive targeted funding, we find that the receipt of PSD is strongly associated with being exempt from sitting NAPLAN, which obstructs any proper examination of the educational outcomes from funding. These results raise the prospect of extending existing funding according to developmental need, but caution that any such change should be accompanied with measures that ensure funding outcomes can be assessed.

JEL classification: I22, I24, I28

Keywords: School funding, disability, standardized test scores

1. Introduction

It is well known that people with disability are much less likely to participate in work, which limits their independence and life prospects. In Australia, despite favourable labour market conditions and strong economic growth over the last twenty years, the employment rates of working-age people with disability remain much lower than for those without a disability. Data from the Household Income and Labour Dynamics Australia (HILDA) shows that in 2014, 35% of people aged 18 to 64 were out of work, compared to 14% for the population without a disability. There are several reasons for the low rates of employment, including the impacts of their condition on their functioning, discrimination in the workplace, disrupted work history associated with the management of their condition, low self-esteem, inferior employment networks and poor school and post-secondary education outcomes (Polidano and Mavromaras 2010).

While there are many potential barriers to employment faced by people with disability, from a policy perspective, closing education gaps is often emphasised as an area where governments can make real difference. Other areas of public policy focus, such as regulations to limit discrimination, have proven to have limited effects (Schumacher and Baldwin 2000 and Hotchkiss 2004) and in some cases, negative effects on employment (DeLeire 2000; Acemoglu and Angrist 2001 and Bell and Heitmueller 2005). Given the role of schooling in laying the foundations for higher-level study and the low rates of school completion among children with disability, it makes sense for governments to concentrate on supporting children with disability in their early years of schooling.[1]

However, it is clear that government efforts must recognise that children with disability start school at a considerable developmental disadvantage compared to their peers. Data from the Australian Early Development Census (AEDC), a population-based evaluation of child development, shows that among Victorian public-school Preparatory (Prep) students, almost half of those with disability are in the bottom quarter in language and cognitive skills, compared to around a fifth of those without disability.[2] Longer-term, in the absence of any

[1] 36% of working-age people with a disability in Australia completed school, compared to 60% overall (ABS 2012).

[2] Excluding students in special schools.

intervention, evidence suggests that initial developmental gaps tend to widen over time because of the cumulative nature of education, or "skills beget skills" (Heckman 2006). This underlines the importance of early educational investments targeted at minimising any disparity in initial outcomes, which have the potential to reduce the risk of costlier outcomes down the track, such as welfare dependence and social exclusion (Chiu and Khoo 2005; Caldwelll and Spinks 2008; Gonski et al. 2011; OECD 2011).

While there are a range of early school measures with an aim of supporting children with disability, a key element of government efforts has been to provide extra funding to cater for the special learning needs of children with disability. Extra funding can take many forms, including formula-based adjustments to block funding grants to allow schools to meet the diverse learning needs that include the needs of children with disability; program based, such as funding for allied health professional services (for example, speech pathologists, physiotherapists, psychologists, occupational therapists), and targeted funding that aims to meet individual student needs.

In this study, we take first steps in trying to understand the outcomes of targeted funding over and above the benefits that are provided by extra school-level funding that is made available through block grants for children with disability in mainstream schools.[3] We do this by examining NAPLAN outcomes of children who receive targeted funding under the Program for Students with Disabilities (PSD) in mainstream Victorian public schools (excluding special schools). A feature of this study is the linking of 2012 Victorian public-school student development information from the AEDC to administrative records of PSD funding and Year 3 NAPLAN. The specific outcomes examined are the rate at which students who are continually funded (at level 1 to 4) from their first year of school participate in Year 3 NAPLAN and whether, having sat NAPLAN, they attain the national minimum score.[4] As a comparison group, against which to measure outcomes of children who receive targeted funding, we use children with an identified disability in AEDC 2012 data that received no targeted funding up to the time they were in Year 3. The study is clearly not an evaluation of targeted PSD funding or anything like it, since it deals with just one group who receive

[3] We exclude students with disability in specialist schools.

[4] This excludes students funded at levels 5 and 6 who have relatively high functioning limitations and educational needs.

targeted funding at the outset of their school careers. But it does point to the type of work that can done with suitable data to assess aspects of the operation of funding programs for students with disabilities.

This study fills an important gap in evidence on the effectiveness of targeted funding in improving the educational outcomes of children with disability. Evidence to date is restricted to qualitative studies by the National People with Disabilities and Carer Council (2009) and the Victorian Equal Opportunity and Human Rights Commission (VEOHRC) (2012), which raise concerns about the adequacy of existing funding and point to the need for more professional development and specialist supports. While these views are informative, they cannot be used to draw conclusions about the effectiveness of existing funding arrangements. Although there is little on the outcomes of targeted funding for students with disability, there is related evidence on the efficacy of early interventions in improving the outcomes of children with autism and other developmental conditions (see Swanson, Lee and Hoskyn 1998, Eldevik et al. 2009, Reichow 2012 for reviews).

A key challenge when comparing outcomes between the two groups is that differences are likely to be partly related to the impact of the PSD and partly due to differences in student characteristics, especially differential capabilities, between the two groups. To get a better sense of differences that may be due to the receipt of funding, we adjust for differences in outcomes related to student characteristics available in the AEDC and NAPLAN using multivariate econometric techniques. The factors that we control for include those related to assessment of child development in the first year of school; identified disability type; teacher identification of special needs; student school-level factors and student socio-economic backgrounds. However, we stress that despite the richness of the factors we control for, there remains a risk that there are unobserved factors that explain differences in outcomes between the groups. While we cannot address this issue with the data available, we discuss in the conclusions how this issue may be addressed through future data extensions.

In the following sections, we outline objectives and criteria for receipt of targeted funding under the PSD program; we then describe the data and the linking process; discuss results and conclude with implications and directions for further research.

2. Targeted PSD funding program

Extra funding in Victoria to support the special learning needs of children in mainstream public schools with disability is delivered through three main channels. The first is through a formula-based block funding grant, known as the Student Resource Package (SRP) that takes into account the diverse learning needs of students, including those with disability.[5] Second, the PSD provides school-level funding for specific programs, such as the Language Support Program (LSP) that provides extra resources to support students with language problems. The third is targeted PSD funding, the focus of this study, which is designed to support individual children with moderate to high educational adjustment needs. For students with disability who do not receive targeted funding, schools are expected to make reasonable adjustments under the *Disability Discrimination Act 1992* to cater for their special needs using funding from the other two sources. However, we note that programmatic funding to mainstream public schools represents only a fraction of targeted funding — $44 million compared to $460 million in 2015 (VDET 2016a). As a result, our analysis on the outcomes from targeted PSD funding represents outcomes over and above any benefits from the receipt of funding from the alternative sources of funding.

There are three broad objectives of targeted PSD funding. They are to help schools in:

1. Student learning: support and improve the learning of students, as measured by performance in NAPLAN, the Victorian Curriculum framework and school based assessment.
2. Student engagement and wellbeing: support the access and participation of students in an inclusive schooling system; as measured by attendance, retention and student school satisfaction surveys.
3. Student pathways and transitions: support transitions for students, into, through and post school as measured through attendance, retention and *On Track* data.

Students can be funded under one of seven categories: autism spectrum disorder, hearing impairment, intellectual disability, physical disability, severe behaviour disorder, severe language disorder with critical educational needs and vision impairment. Eligibility for funding depends on meeting specific diagnostic-criteria that are based on guidelines set by

[5] From 2016, it also includes an extra equity component.

the World Health Organisation (see Table A1, appendix A). For example, to be funded under intellectual disability, a student must have score two standard deviations below the mean on tests of general intelligence and adaptive behaviour and a history and evidence that the problem can be expected to persist during school years. Although there are seven categories of disability funding, the overwhelming majority of funded students (85% in 2015 (VDET 2016a)) were under intellectual or autism spectrum disorder.

Targeted PSD funding is provided at six levels depending on the level of support needed and schools are given autonomy to decide how the funding is used. These may include, but are not limited to, funding of a specialist teacher or allied health professional, teacher training, education support staff (aid) and/or staff training.

To access targeted PSD funding, schools must submit an application containing evidence that addresses the PSD eligibility criteria by February in the year of commencing school. Before an application is made, schools arrange for a professional screening to establish whether the criteria for funding are met and complete an Educational Needs Questionnaire (ENQ), which is used to determine the level of funding needed. The application will not proceed if eligibility cannot be established from the initial screening, but the Principal is required to make other provisions for support from other available resources. If an application is made, verification of eligibility is determined by Victorian Department of Education and Training (VDET) and independent professionals. Funding under the PSD is made available to schools for professional screening and administering applications.

In 2012, the first year of funding available to students examined in this study, the targeted funding amounts (in 2012 terms) were: $6095 (level 1); $14,095 (level 2); $22,250 (level 3); $30,366 (level 4); $38,421 (level 5) and $46,519 (level 6).[6]

3. Data

The main data source for analysis is 2012 Victorian public-school (excluding special school) entrants from the Australian Early Childhood Census (AEDC) linked to 2012-2015 PSD funding information from the Victorian Department of Education and Training (VDET) and NAPLAN 2015 assessment data. The linking of the data sources was carried out by VDET. To conduct the linking exercise, Victorian public-school (excluding special schools) entrants

[6] www.education.vic.gov.au/management/srp/budget/ref015/psd1-6.htm.

from AEDC 2012 was used as the base population and targeted PSD and NAPLAN information was linked-in. For targeted PSD, linking was done using a unique student identifier common to both datasets; while for NAPLAN, identifying information common to both datasets was used (name, date of birth, gender and school number) in a probabilistic matching algorithm. Data presented in Table 1 show an 88% match between AEDC and NAPLAN. In the latter case, there may be a number of reasons for the less than perfect match, but the most likely explanation is that some students who commence schooling in a public school move to the private system.[7] More importantly for this study, we find no difference in the proportion of AEDC students who are matched to NAPLAN by targeted PSD funding status.

Table 1. Overview of the AEDC 2012 match with NAPLAN outcomes by targeted PSD funding status

	Any receipt of Targeted PSD	No receipt of targeted PSD
AEDC	1,409	46,548
AEDC matched with NAPLAN	1,238	41,144
	88%	88%
Sat NAPLAN reading test[a]	428	38,775
	35%	94%
Exempt	563	138
	45%	0%
Absent	52	1,279
	4%	3%
Withdrawn	195	952
	16%	2%

Note: AEDC 2012 is for Victorian public school entrants and NAPLAN 2015 data is for public school students, excluding special school students. AEDC and NAPLAN data are matched using unique postcode and date of birth combinations. [a]The proportion who sits the reading test is almost identical to the proportion who sits the tests of the other NAPLAN domains.

3.1 The Australian Early Development Census (AEDC)

The AEDC is a triennial national population-based evaluation of individual child development in the first year of full-time schooling. The evaluation is completed by teachers and contains around 100 questions on each child's development in five key domains: physical health and wellbeing; social competence; emotional maturity; language and cognitive skills

[7] There was also a small, but disproportionate number of the base population with targeted PSD funding who appeared in 2014 NAPLAN. To avoid any bias in the sample, these were also linked-in.

(school-based); and communication skills and general knowledge. For each domain, responses to relevant questions are combined to produce an overall score from 0 to 10, where a higher score indicates a higher level of development. Domain scores have been developed and validated for use as a population measure at a group level, but have not been psychometrically tested for application in relation to individual children (Australian Department of Education and Training (ADET) 2016). For each domain, there are a series of sub-domains over which students are assessed, also on a scale of 0 to 10. For example for the language and cognitive skills domain, there are sub-scales for basic literacy, interest in numeracy and literacy, advanced literacy and basic numeracy, although these have not as yet been validated (AEDT 2016).

Importantly, the AEDC also includes a battery of questions regarding child disability/impairment that are known to the school. To prepare for the AEDC, teachers are asked to access all student details held by the school, including information on diagnosed medical conditions and special needs that are collected upon enrolment.[8] Disability is identified by whether the teacher reports the child has a condition/impairment that influences their ability to do school work in a regular classroom, where condition/impairment is either a physical disability; visual impairment; hearing impairment; speech impairment; learning disability; emotional problem; behavioural problem or whether they have an enduring neurological condition.[9] It is important to stress that this definition is based on whether the teacher identifies the presence of a condition that affects the student's ability to work in a regular classroom, rather than whether or not the student has a diagnosed medical condition. We chose this definition over the diagnosis of a medical condition because it better aligns with the World Health Organisation definition of disability being associated with a condition that limits an activity, which is appropriate given the objectives of PSD.

As well as questions related to impairments, there are also questions on whether the child has any enduring problems including a chronic illness; neurodevelopmental disorder (e.g. Foetal Alcohol Syndrome) or other enduring problem. Finally, teachers are asked whether the student has any special needs or special assistance because of chronic medical, physical or

[8] Visit the website https://www.aedc.gov.au/Websilk/Handlers/ResourceDocument.ashx?id=f3912564-db9a-6d2b-9fad-ff0000a141dd for more information on teacher preparation.

[9] Represent responses to variables D1-D7 and D10B in the AEDC.

intellectually disabling conditions (e.g. autism, cerebral palsy, Down syndrome), based on a medical diagnosis or medical diagnoses. Teachers are also asked whether they believe the child needs further assessment (e.g. medical or physical, behaviour management, emotional or cognitive development).

3.2 Targeted funding under the Program for Students with Disabilities (PSD)

The PSD data from the Victorian Department of Education and Training (VDET) contains three fields — a flag for receipt of targeted PSD funding and two categorical variables for level of funding (Level 1 to Level 6) and condition that the student is being funded for (autism spectrum disorder (ASD); intellectual impairment; physical disability; visual impairment; hearing impairment; severe language disorder and severe behaviour disorder). These three fields are provided for both 2012 and 2015.

3.3 National Assessment Program of Literacy and Numeracy (NAPLAN)

NAPLAN is an annual national assessment of students in Years 3, 5, 7 and 9 that aims to track student progress through school in the domains of reading, writing, language conventions (spelling, grammar and punctuation) and numeracy. At the time of analysis, only information on Year 3 NAPLAN data was available for our 2012 AEDC students. NAPLAN is designed to test student skill levels for their age, including whether students meet minimum national standards that are deemed essential for continued learning. As well as NAPLAN test scores for the AEDC 2012 cohort, the NAPLAN data also contains student socio-economic information, such as parents' education, student country of birth, confidentialised unique school identifier and school region.

While everyone is expected to sit NAPLAN, there are several reasons why students may not sit the test. First, students with significant or complex disability (and those from a non-English speaking background who have arrived in Australia less than a year ago) may be exempted by the school from sitting the test. However, exemptions are not automatic; a parent/carer is required to sign a consent form and adjustments are available to reasonably accommodate their condition. Students can also be withdrawn from NAPLAN by their parents on the basis of religious beliefs or due to philosophical objections to testing. Finally, students may be absent during the period of testing.

Data provided in Table 1 shows that only around a third of targeted PSD funded students commencing in mainstream Victorian public schools in 2012 sat NAPLAN in 2015,

compared to 94% of those who receive no targeted funding. Of the 1,115 funded student who were matched to NAPLAN data, only 265 sat NAPLAN. The remaining 850 are mostly exempted by the schools (715) or are withdrawn by parents (103).

3.4 Sample for analysis

In this study we examine outcomes of targeted PSD for 593 Victorian mainstream public-school entrants in 2012 who received funding in both 2012 and 2015 below level 5, for which NAPLAN data can be matched (Table 2). We omit 67 students who lost their funding between 2012 and 2015 and 541 who gained it because we cannot observe the duration over which they received funding, which muddies any effect on outcomes.

Table 2. Sample of analysis by AEDC 2012 disability status

AEDC 2012 disability status	Sample for analysis[a]		Omitted from the sample					
			Targeted PSD recipients					
	PSD funded[b]	Comp. group[c]	No reported disability 2012	Level 5-6 funded	Lost funding in 2015	Gained funding in 2015	No disability 2012 & 2015	Total
No disability	0	0	25	0	6	165	35,797	35,993
Physical	14	111	0	2	3	3	0	133
Visual	4	679	0	0	0	8	0	691
Hearing	13	156	0	0	0	5	0	174
Speech	7	2,210	0	0	4	60	0	2,281
Emotional/ behavioural	40	1,062	0	0	3	81	0	1,186
Learning[d]	75	181	0	0	10	30	0	296
Multiple								0
With learning	383	446	0	10	34	137	0	1,010
Without learning	57	502	0	0	7	52	0	618
Total	593	5,347	25	12	67	541	35,797	42,382[e]

Note: The sample of analysis is based on AEDC 2012 observations that can be matched to NAPLAN. [a]Sample of analysis is those identified with a disability in AEDC 2012, excluding those funded at level 5-6, those who lost funding, those who gained funding in 2015.[b]Has a disability in AEDC 2012 and is funded in 2012 and 2015. [c]Has a disability in AEDC 2012 and receive no targeted funding in 2012 and 2015. [d]Includes those identified with a neurological impairment. [e]This represents all mainstream Victorian public school Prep children in AEDC who could be matched to NAPLAN. From Table 1, 1,238 who received some funding 2012-15, plus 41,144 who received none.

Central to estimating the outcomes of funding for this group is constructing a like comparison group against which outcomes might be compared. In this study, our comparison group is

Victorian mainstream public-school entrants in 2012 who receive no targeted funding, but who are identified by their teacher in the AEDC as having a disability. To make the comparison group as close as possible in attributes to the PSD-funded group, we restrict the definition of disability to AEDC disability types that are comparable to those that are funded under targeted PSD — learning difficulty or neurological impairment; physical disability; visual impairment; hearing impairment; speech difficulty; emotional or behavioural problem. To reduce differences between the funded and comparison group further, we also omit 12 students who are funded at the Level 5 and 6 because they have severe and complex disability that makes them very different.[10]

From statistics reported in Table 2, there are 6,389 mainstream public school Prep students with disability identified in the AEDC (with matching NAPLAN results), or 16% of Victorian mainstream public school Prep students in 2012.[11] This is consistent with the 15% of public-schools students that VDET has identified have a disability that needs some level of 'reasonable adjustment' (VDET 2016a). Among the AEDC disability categories, the most commonly identified conditions are speech impairments (5%), learning impairment (including those combined with other conditions) (3%), behavioural/emotional problems (3%) and visual (2%).

Of the 6,389 with disability in 2012, 672 received targeted PSD funding or 11%. From data presented in Table 2, targeted PSD funding appears to be concentrated among children with a learning impairment. Of the 672 students who receive targeted funding, 512 or 76%, have a learning or neurological impairment. Among the 1,306 children in the sample that are identified as having a learning impairment, this represents a funding rate of 39%. In contrast, the funding rates for other conditions are relatively low — 14% for physical, 10% for multiple conditions that do not include learning impairments, 7% hearing, 4% emotional behavioural and 1% for visual.[12]

[10] None of these students sit NAPLAN in 2015.

[11] Which is consistent with the rate for the entire Victorian public school population in ADEC 2012.

[12] These rates are calculated for students who do not have a learning or neurological impairment or any other impairment.

It is important to stress that the low rates of funding among mainstream public-school entrants may represent both a large proportion of children with disability who do not meet the targeted PSD criteria for funding and difficulties demonstrating eligibility under the criteria. There may be a range of reasons why students may not apply or be unable to demonstrate that they meet the criteria. These include: difficulty identifying certain conditions early on; school administrative difficulties in co-ordinating an application for funding; and a reluctance of parents to have their child assessed, especially if they believe that funding will lead to their child being stigmatised. The relative importance of school and student-level factors associated with the receipt of targeted PSD funding is examined using econometric techniques (section 4).

3.5 Defining outcomes

As outlined in the PSD guidelines, there are three main objectives of targeted PSD (VDET 2016b). In this study, we focus only on outcomes related to one objective — to support and improve learning. Despite the limited number of funded students who sit the tests, we choose to examine NAPLAN outcomes because it is identified in the PSD guidelines as a key measure of student learning (VDET 2016b). Also, other measures of learning, such performance in the Victorian Essential Learning Standards (VELS), could not be linked to AEDC 2012 at the time of analysis. Analysis is focussed on the NAPLAN domain of reading, but results for numeracy are much the same.

We use two measures from NAPLAN: whether or not the student sat NAPLAN; and, conditional upon sitting NAPLAN, scoring above the national minimum reading standards. In terms of raw statistics, 83% of the sample for analysis is observed to sit NAPLAN, but with stark differences in the rate at which the funded and comparison group participate — 34% compared to 89% (Table 3). However, such stark differences are not observed in attainment of minimum national standards among those who participate — 92% compared to 94%.

It is important to point out that the raw differences in NAPLAN participation rates between the targeted PSD recipients and comparison group are likely to be partly due to student differences, such as differences in student capabilities, and not due to the receipt of PSD. We attempt to adjust for student differences using multivariate analysis techniques that are discussed in the next section. The other point of note is that the funded students who sit NAPLAN are a select group and their NAPLAN scores are likely to be well above those of other funded students had they participated in NAPLAN. This must be born in mind when

making interpreting any estimated differences in the attainment of national standards between the two groups.

Table 3. NAPLAN outcomes for the sample for analysis[a]

	Recipients of targeted PSD[b]	Comparison group[c]	Total
Participated in NAPLAN reading test			
Yes	204	4,734	4,938
	34%	89%	83%
No	389	613	1,002
	66%	11%	17%
Total	593	5,347	5,940
Attained national minimum standards in NAPLAN reading, given participation			
Yes	188	4,445	4,633
	92%	94%	94%
No	16	289	305
	8%	6%	6%
Total	204	4,734	4,938

[a]Sample of analysis is those identified with a disability in AEDC 2012, excluding those funded at level 5-6, those who lost funding, those who gained funding in 2015 .[b]Has a disability in AEDC 2012 and is funded in 2012 and 2015. [c]Has a disability in AEDC 2012 and receives no targeted funding in 2012 and 2015.

4. Econometric method

The main challenge in examining the outcomes from targeted PSD funding is to adjust for differences in student characteristics between funded students and their comparators (observed in Table 3) that may also affect outcomes. In the absence of any information on random variation in the receipt of targeted PSD, such as random differences in assessment of eligibility for students on the margin of meeting the eligibility criteria,[13] we rely on the richness of observed student characteristics in our data to make these adjustments. We employ two standard multivariate techniques — regression and Kernel propensity score matching.

In the context of this study, propensity score matching adjusts for the effects of group differences by using information in the data to construct a 'like' or 'matched' comparison

[13] For example, because their tested IQ is just above or just below the threshold for funding under the intellectual impairment category.

group for each targeted PSD recipient. Such comparison groups are generated for all funded students and the average difference represents the effect that can be assigned to the receipt of targeted PSD funding. Rather than explicitly constructing like groups using information in the data, regression techniques calculate the difference in outcomes that can be attributed to a student characteristic, separate from any effects that other student characteristics exert on the outcome. Under regression analysis, the estimated coefficient for targeted PSD funding represents the average outcome across all targeted PSD recipients that is not related to any other observed differences between the groups, such as differences in observed student capabilities.

In practice, these approaches provide similar results in most circumstances because they both rely on the richness of the data to adjust for differences in student characteristics. In particular, to adjust outcomes properly for differences in the characteristics of students in the funded and comparison groups, both techniques rely on information in the data that is associated with both group assignment and student outcomes. Such information is likely to be, but not necessarily limited to, student capability, socio-economic disadvantage and school-level factors. The choice and construction of such information in this study is discussed in section 4.1 below. An advantage of matching is that it restricts analysis to observations where there is overlap in the characteristics of treatment and comparison group (Blundell and Costa Dias 2009), although because we already restrict our sample of analysis (as discussed section 3.5), this is not likely to be much of an advantage in this setting.

4.1 Estimating the relationship between receipt of targeted PSD funding and student characteristics

As discussed in the preceding section, the use of multivariate techniques to adjust for group differences relies heavily on the use of information in our data that explains both group assignment and student outcomes. To identify the importance of such factors in our data, we first run regression (binary probit) models that measure the relationship between the receipt of funding and a range of factors among students in our sample of analysis. As well as pointing to the relative importance of various student characteristics in the multivariate adjustment process, the results from this model may point to variation in receipt that is not related to student capacity or impairment, such as school-level factors. Such variation may represent barriers to the receipt of funding, for example, hurdles in identifying children who are eligible, gaining support from parents and co-ordinating applications for funding.

Table 4. Mean characteristics for the sample for analysis[a]

	Recipients of targeted PSD[b]	Comparison group[c]
Outcomes		
NAPLAN participation	34%	88%
Attained minimum national standards, given NAPLAN participation	92%	94%
Student capabilities and impairments		
Rank in AEDC language and cognitive skills domain score among mainstream public-school Preps in Victoria[d]		
Bottom 10%	46%	16%
11-25%	24%	22%
26-50%	18%	27%
Top 50%	12%	35%
AEDC impairment/condition		
Physical	2%	2%
Visual	1%	13%
Hearing	2%	3%
Speech	1%	41%
Emotional/behavioural	7%	20%
Learning impairment[e]	13%	3%
Multiple, with learning impairment	65%	8%
Multiple, without learning impairment	10%	9%
AEDC special needs identifier	96%	11%
Student school-cohort characteristics		
AEDC percentage of school cohort with disability		
0-25%	74%	70%
26-50%	24%	28%
51-75%	2%	1%
More than 75%	1%	0%
AEDC percentage of funded disability within school cohort		
0-25%	57%	92%
26-50%	35%	7%
51-75%	2%	0%
More than 75%	6%	0%
AEDC size of school cohort		
Less than 30 entrants	23%	19%
31-60 entrants	33%	31%
61-80	18%	19%
81-100	11%	12%
More than 100 entrants	15%	19%

Continued

Student socio-economic background		
Mother's highest education qualification (NAPLAN)		
Less that Year 12	27%	24%
Year 12	12%	13%
VET qualification	24%	28%
Diploma/Advanced Diploma	13%	12%
Degree or higher qualification	24%	23%
AEDC non-English speaking background	20%	13%
AEDC Aboriginal or Torres Strait Islander (ATSI)	4%	3%
AEDC country of birth		
Australia	95%	96%
Other English-speaking country	2%	2%
Non-English-speaking country	4%	2%
AEDC female	26%	35%
AEDC indicator for lives in Melbourne	69%	67%
Number	593	5,347

[a]Sample of analysis is those identified with a disability in AEDC 2012, excluding those funded at level 5-6, those who lost funding, those who gained funding in 2015. [b]Has a disability in AEDC 2012 and is funded in 2012 and 2015. [c]Has a disability in AEDC 2012 and receives no targeted funding in 2012 and 2015. [d]Rank is based on all domain scores available on Victorian Preps in the data, including those without disability and those who are not matched to NAPLAN, but excluding students from special schools. This measure is generated by the authors and is not consistent with standard AEDC reporting and should not be attributed to the Australian Department of Education and Training. [e]Includes those identified with a neurological impairment.

We generate a range of variables under three major categories that are related to both the receipt of funding and student outcomes — student capacity and impairments; student school-cohort characteristics and student socio-economic background. These 'control' variables are presented in Table 4 together with their mean values for the funded and comparison group. Table 4 also includes the mean outcome values for the two groups.

There are some key points to take away from Table 4. First, although the comparison group does not receive targeted funding, on average, their language and cognitive development is well below those without disability. Specifically, 38% of the comparison group have a language and cognitive skills domain score in the bottom quarter of mainstream public-school Preps, compared to 18% of those without disability. Second, as far behind as the comparison group is compared to those without disability, the group that receive targeted funding are further behind. We estimated that 70% of the recipients of targeted funding have a language and cognitive skills domain score in the bottom quarter among mainstream public-school Preps. The main reason for the lower language and cognitive domain scores of funded

students relative to the comparison group students is a higher rate of learning impairment — 77% compared to 12%.

A second point of note is that among the comparison group, 11% (604 students) are reported to have special needs or require special assistance due to a diagnosed chronic disabling condition. The main conditions these students are reported to have are a learning disability (306), emotional/behavioural problem (107) or speech impairment (86). However, this result should not be interpreted as meaning that only 11% of the comparison group would benefit from targeted funding. The teacher response to this question needs to be considered within the wider context of the AEDC. Given that teachers are responding to the question on the basis of medical diagnosis of a chronic condition, it may under-represent any true assessment of need because it ignores need associated with temporary conditions or undiagnosed conditions.

Third, there appears to be large differences in the rate of receipt of targeted funding among children with disability across schools. Out of 1,152 schools in the sample, 518 have at least 6 Prep children with an identified disability. Of the 518, 202 receive no targeted funding for any of their Preps, 255 receive targeted funding for up to a quarter and 164 receive targeted funding for more than a quarter (Table A2 in appendix A). In terms of our sample, those who receive targeted funding are much more likely to be concentrated in schools that have higher rates of targeted funding. Specifically, 43% of schools attended by recipients have a targeted funding rate of over a quarter, compared to 7% of schools attended by the comparison group (Table 4). This is a large discrepancy in targeted funding rates, but it does not necessarily mean that schools attended by recipients of targeted funding are better at attaining funding for their students with disability. Differences in the characteristics of students in schools attended by the two groups may also explain the discrepancy. More specifically, it could be related to the concentration of funded students with more complex learning difficulties (that have a higher funding rate). We attempt to disentangle the relationship between the receipt of targeted funding and school and student-level factors in the regression analysis.

Finally, compared to differences in student capabilities and impairments and school-level factors, the differences in socio-economic characteristics between the two groups are minor.

5. Results

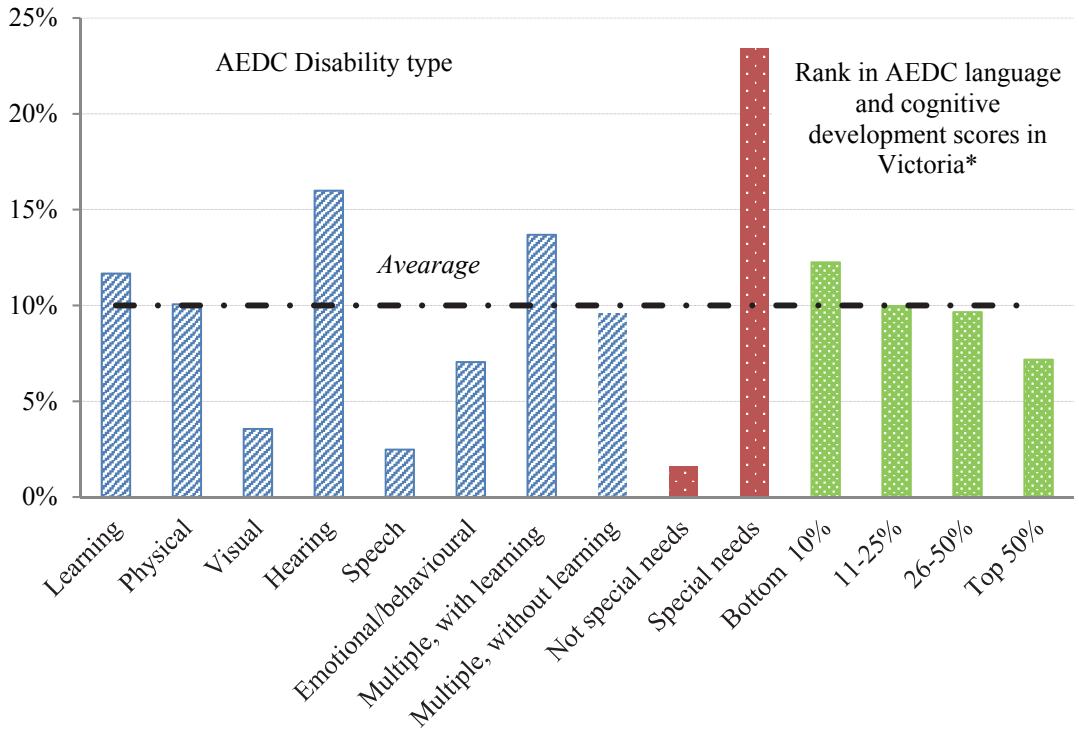
In what follows, we discuss results from multivariate regression models that measure the importance of student and school-level factors related to the receipt of targeted PSD funding and NAPLAN outcomes. All results presented in bar graphs are average probabilities, or average rates, of an outcome (measured in percentage terms on the y-axis) associated with the presence of student personal or school-level trait (represented by the category on the x-axis). When interpreting the results, it is important to keep in mind that they represent partial estimates, that is average rates of an outcome in the sample associated with a particular trait, irrespective of the levels of all other traits.

5.1 Receipt of targeted PSD funding

In this study, we measure receipt of targeted funding as a binary outcome of whether a Victorian mainstream public-school Prep with disability in 2012 received targeted PSD funding in 2012 and 2015. We remind the reader that those who gain or lose targeted PSD finding and those who receive level 5 or 6 funding are omitted from the analysis unless otherwise stated. Below we present the probabilities, or rates of receipt, of targeted PSD funding associated with student personal and school-level traits.

Across the three categories of explanatory variables, results from Figures 1 to 3 show that while student capabilities and impairments and school characteristics are important factors in the receipt of targeted PSD funding, student socio-economic background is not (Figure 3). This provides some comfort that family background does not influence the rate at which parents are willing to support targeted funding applications or influence which students are targeted for funding. In the following sub-sections, we discuss results under each of the three main variable categories.

Figure 1. Estimated receipt rate of targeted PSD funding in 2012-15 associated with levels of student development, impairment and special needs among Victorian public school children with AEDC identified disability in Prep



*Excludes scores of students from special schools.

Note: each bar represents the estimated average rate of funding for children with AEDC identified disability that is associated with the presence of a particular trait, independent of the levels of all other traits that are included in the regression model (student capacity and impairments, attended school traits and traits related to student socio-economic background).

Results presented in Figure 1 highlight that the nature of the child's condition plays a much more important role in determining targeted PSD funding receipt than their language and cognitive development when they first start school. On average across our sample, teacher identified special needs is associated with a 23% chance of receipt of targeted funding compared to a 2% rate special needs was not identified. Taken together, being identified as having special needs is associated with a 21 percentage point increase in the chances of attaining targeted PSD funding on average across the sample. However, we caution that the strong association between teacher identified special needs and receipt of targeted funding may be due in part because of reverse causation; specifically, teachers are making assessments of special needs based on previously made allocations of targeted funding.

Impairment type in Prep is also important in explaining the receipt of targeted PSD. On average across our sample, having a learning impairment is associated with a 12% chance of receiving targeted funding and a 14% chance if the condition is combined with one or more conditions from the other impairment categories. The rate of receipt of targeted funding associated with hearing conditions is also above average at 16%. Receipt rates associated with physical of multiple disabilities without a learning impairment are around the sample average receipt rate average of 10%. At the lower end, receipt rates associated with emotional/behavioural, speech and visual are 7%, 3% and 4% respectively. Differences in receipt rates associated with impairment type reflect the nature of the targeted PSD criteria. In particular, as the appropriate funding category names imply, funding for speech and emotional/behavioural problems is only for severe and ongoing problems, while funding criteria for visual impairment is consistent with that for being legally blind. Although there is a low rate of targeted funding for children with speech impairments, PSD programmatic funding is provided to the Language Support Program to assist teachers in developing programs for students with language difficulties.

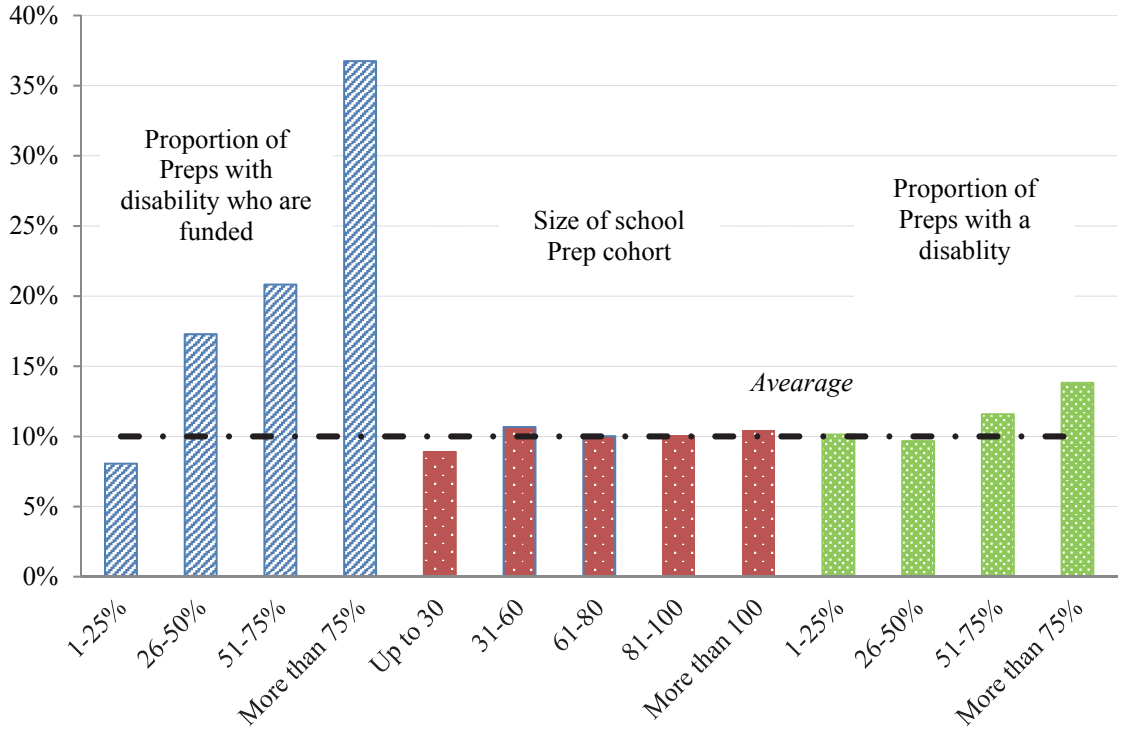
AEDC language and cognitive development is relatively unimportant in influencing receipt of targeted funding (Figure 1). At the extremes, being in the bottom 10% in language and cognitive skills across the state in mainstream public schools is associated with a 12% chance of receiving targeted PSD funding, compared to 7% for being classified as being in the top 50%. This represents a 5 percentage point difference in receipt rates associated with student development in Prep, which is a statistically significant difference (at 95% confidence). It is important to keep in mind that the partial relationship between language and cognitive development and the receipt of targeted funding may have been somewhat stronger if we had not excluded those funded at levels 5 and 6.

Student's school characteristics

While the nature of a child's condition is important, results presented in Figure 2 suggest that school practices may also play an important role in influencing the receipt of targeted funding. Possible interpretations are that the school environment is important in identifying early signs of disability and/or that there are differences in the efficacy of schools in initiating and co-ordinating applications for funding. Estimates from Figure 2 suggest that irrespective of school size, student capabilities and impairments and family background, on average attending a mainstream public school with a higher rate of targeted funding in Prep is

associated with a higher individual chance of receipt of targeted funding. Attending a mainstream public school where three quarters or more of Prep students with disability receive targeted funding is associated with a 37% chance of individual receipt of targeted funding, irrespective of student capabilities, impairments and school size. At the other extreme, attending a mainstream public school where the rate of receipt of targeted funding is up to a quarter is associated with an 8% chance of individual receipt.

Figure 2. Estimated chances of receipt of targeted PSD receipt in 2012-15 associated with characteristics of the school Prep cohort among Victorian public school children with AEDC identified disability in Prep



Note: each bar represents the estimated average rate of funding for children with AEDC identified disability that is associated with the presence of a particular trait, independent of the levels of all other traits that are included in the regression model (student capacity and impairments, attended school traits and traits related to student socio-economic background).

A potential problem with these results is that in schools where there are few Prep students, individual student's own funding status has a large bearing on the prep cohort funding rate. This will tend to bias the results upwards. To test the sensitivity of our results to such bias, we also omit observations from schools that admit less than 20 Preps. The nature of these alternative results is the same, but their magnitude of the estimates is smaller, especially for

schools with a funding rate greater than three-quarters — 8%, 17%, 20% and 26% respectively.[14]

The positive relationship between school Prep funding rates and individual chances of funding suggest that there are administrative differences among schools that influence the individual chances of receiving funding. Findings from the recent VDET review of PSD (VDET 2016a) suggest that differences may be related to differences in schools in complying with the application process:

> "The current approach to assessing eligibility for funding through the targeted PSD component is costly, inconsistently understood and applied by schools, and results in inequitable funding outcomes", (Finding 17, p. 122).

An alternative explanation is that students who meet the criteria may concentrate in certain schools. However, we stress that the concentration of disability is controlled for in our regression models, so that any concentration effect would have to be because students sort into schools on the basis of targeted funding criteria that are *not* controlled for in this study. One possibility is that students with learning impairments who meet the criteria for targeted funding concentrate in the same schools, but that AEDC domain score of language and cognitive skills does not adequately control for differences in IQ, which is used determine eligibility. Parents of these children may select the same schools because they offer more supportive environments. Regression models of receipt of targeted funding estimated on separate samples of Preps with and without a learning impairment do not support this alternative interpretation. Both sets of results from these models (depicted in Figure A1 in appendix A) show higher individual chances of targeted funding receipt for students in schools that have higher rates of disability funding. This relationship appears to be even stronger for funding of conditions that *do not* involve a learning impairment.

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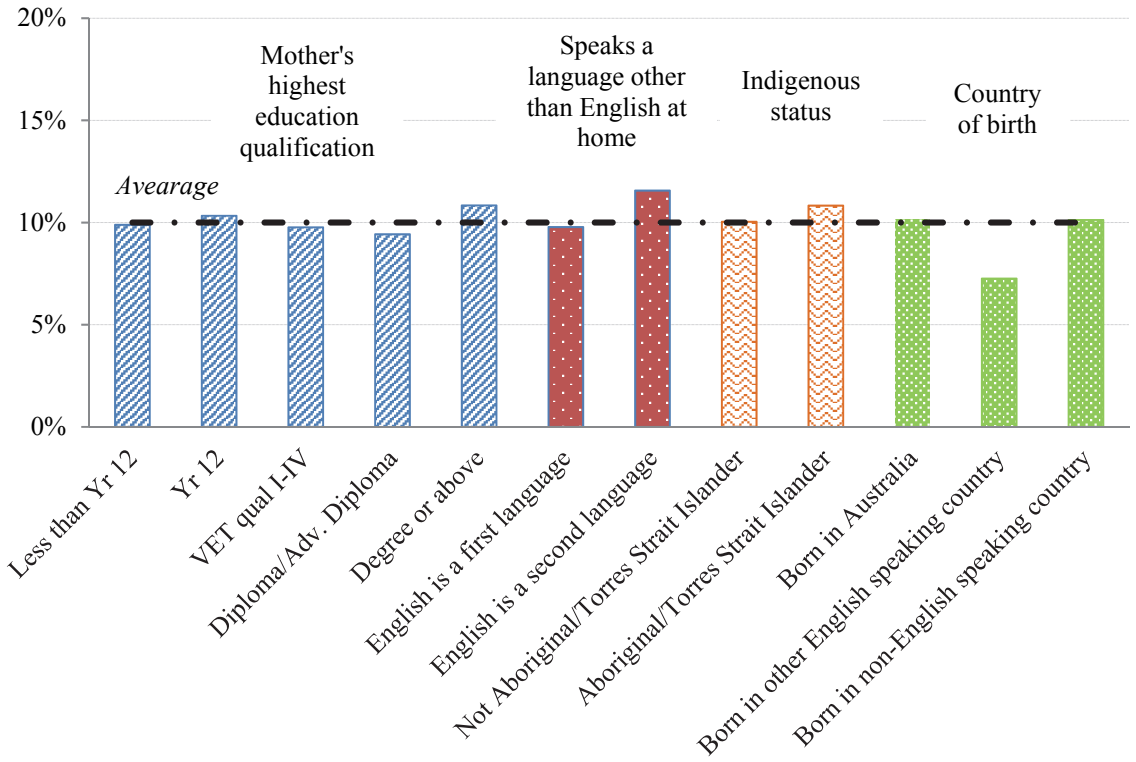
[14] We also estimate results where observations from schools with less than 30 Preps is omitted and the results are close to those when we omit observations from schools with less than 20. Results are also generated for a model where we leave out the student's own funding and disability status from school estimates (leave out means). These results are again similar to those produced by omitting the smaller observations, although only funding rates above half are associated with greater than average chances of receiving funding.

The rates of disability within the school Prep cohort only matter to the individual chances of receipt if more than three quarters have a disability. Results from Figure 2 show that on average, having more than three quarters of peers with disability is associated with a 14% chance of individual student receipt of targeted funding. For levels less than this, the rates are around the sample average of 10% with no significant differences in the levels.

We find no evidence that school size matters to the chances of individual funding receipt. Therefore, any difference in effectiveness of schools in attracting funding is likely to do with procedural differences that are unrelated to the economies of size.

Student's socio-economic background

Figure 3. Estimated chances of receipt of targeted PSD funding in 2012-15 associated with student socio-economic background among Victorian public school children with AEDC identified disability in Prep



Note: each bar represents the estimated average rate of funding for children with AEDC identified disability that is associated with the presence of a particular trait, independent of the levels of all other traits that are included in the regression model (student capacity and impairments, attended school traits and traits related to student socio-economic background).

None of the student socio-economic factors used in this study have any significant association with the receipt of targeted PSD funding. This is depicted in Figure 3 by bars that all sit along the sample average receipt rate. It is important to note that we also experimented

with other controls for socio-economic background, including socio-economic of student's postal area (socio-economic indexes for areas (SEIFA)), whether or not the student participates in a breakfast club (a measure of child deprivation) and whether or not the child attending pre-school. None of these alternative measures had any statistically significant association with the receipt of targeted funding.

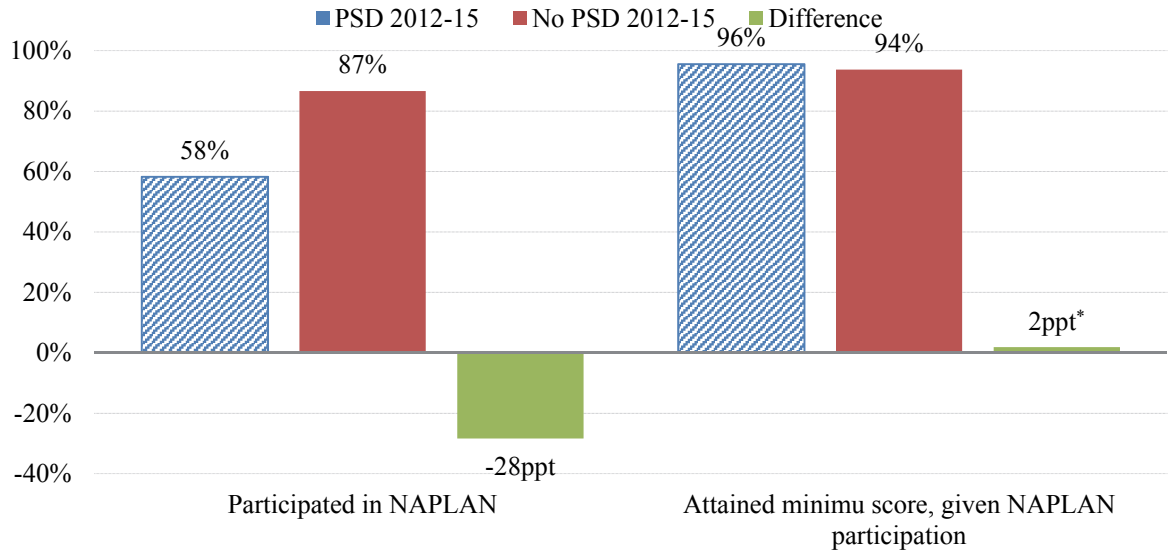
5.2 NAPLAN outcomes from PSD funding

Results in this section measure the relationship between the receipt of targeted PSD funding and two NAPLAN outcomes; participation in NAPLAN reading and attainment of minimum national reading standards if the NAPLAN reading test was sat. All results are from the multivariate regression model, with the same control variables used in estimating models for targeted funding receipt; that is, those related to student capacity and impairments, attended school traits and traits related to student socio-economic background. Results estimated using propensity score matching are much the same as those reported here (see Figure A2 in appendix A).

Students with disability

Overall, the results presented in Figures 4 and 5 below suggest that the receipt of targeted funding is strongly linked to exemption from NAPLAN testing for students with disability. Results in Figure 4 show that independent of a range of other student traits, the receipt of targeted PSD funding is associated with a 58% chance of participating in NAPLAN, compared to 87% chance with no targeted funding. In net terms, the receipt of targeted PSD is associated with a 28 percentage point lower chance of sitting NAPLAN among students with identified disability. This means that around half of the raw 55 percentage point gap in the rates of sitting the test in Table 4 is explained by differences in the student, school and family characteristics of the two groups, leaving half that cannot be explained by observed differences.

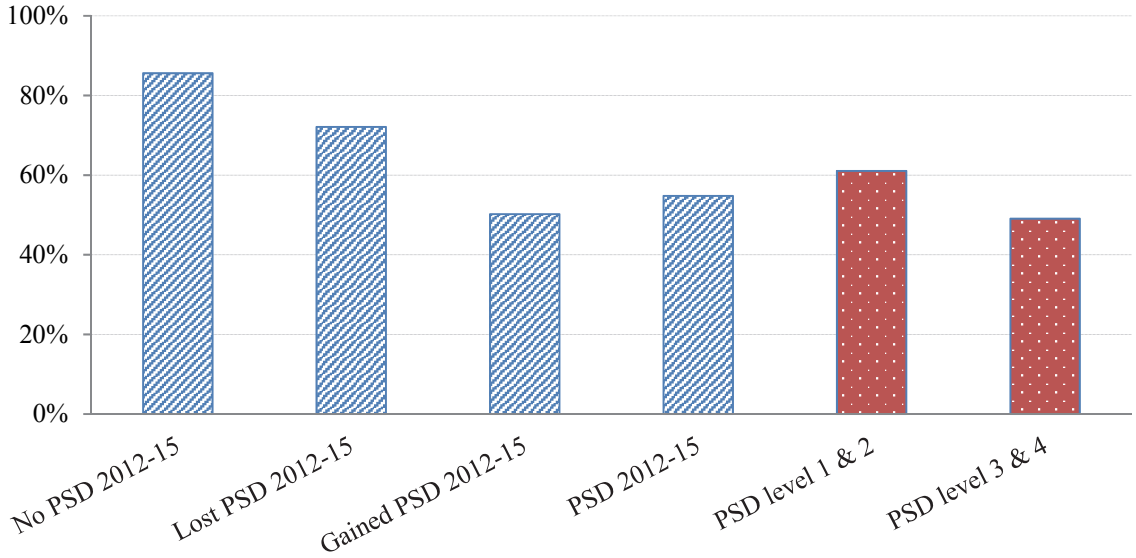
Figure 4. Estimated Year 3 NAPLAN participation rate and national standard attainment rate associated with the receipt of targeted PSD funding among Victorian public school children with AEDC identified disability in Prep, multivariate regression



Note: the bars for PSD 2012-15 and No PSD 2012-15 represent the estimated average NAPLAN participation rate and national standard attainment rate associated with the receipt of targeted PSD and no receipt of targeted PSD respectively, controlling for differences in student capacity and impairments, attended school traits and traits related to student socio-economic background between the two groups.

*Not statistically difference from zero.

Figure 5. Estimated Year 3 NAPLAN participation rate associated with the receipt of targeted PSD funding among Victorian public school children with AEDC identified disability in Prep



Note: each bar represents the estimated average rate of NAPLAN participation associated with the level of PSD funding for a students with identified disability in Prep in the AEDC 2012 that have otherwise average disability types, special needs status, AEDC language and cognitive development in Prep, school characteristics and socio-economic background. The estimates for targeted PSD level are from a separate regression model to estimates for receipt of any targeted PSD funding.

Importantly, estimates in Figure 5 show that the level of targeted funding, which is linked to the condition severity, does not make much of a difference to the rate of exemption from NAPLAN. While there is a 22 percentage point difference in the rate of participation between those funded at levels 1 and 2 and those who receive no targeted funding (83% participation rate compared to 61%), there is only a 10 percentage point difference between those funded at level 1 and 2 and those funded at 3 and 4. This suggests that while those with more severe conditions are exempted at a higher rate, the bulk of the overall impact on NAPLAN participation rates is observed at the margin between receipt of targeted funding and not.

Results estimated according to changes in targeted funding between 2012 and 2015 add further weight to our interpretation that targeted PSD is a flag for exemption from NAPLAN (Figure 5). When we extend the sample to include those who lost and gained funding between 2012 and 2015, we find that gaining funding is associated with a similar exemption rate as having been funded throughout the entire period (49%). In contrast, the participation rates associated with loosing targeted funding are much more like those who never had it (71%). If those who loose and gain targeted funding over the period have functional limitations that put them on the margin of funding receipt, then it is highly likely that their funding status explains the differences in NAPLAN participation and not unobserved differences in their ability to sit NAPLAN.

Among students who sit NAPLAN, we find no significant relationship between receipt of targeted funding and attaining minimum national NAPLAN standards (Figure 4). However, the select nature of the funded group who sits NAPLAN makes it difficult to make any conclusions about the effectiveness of targeted funding in improving academic outcomes. Model results by level of targeted funding yield similar results as does using NAPLAN scores rather than attainment of minimum standards as the outcome variable.

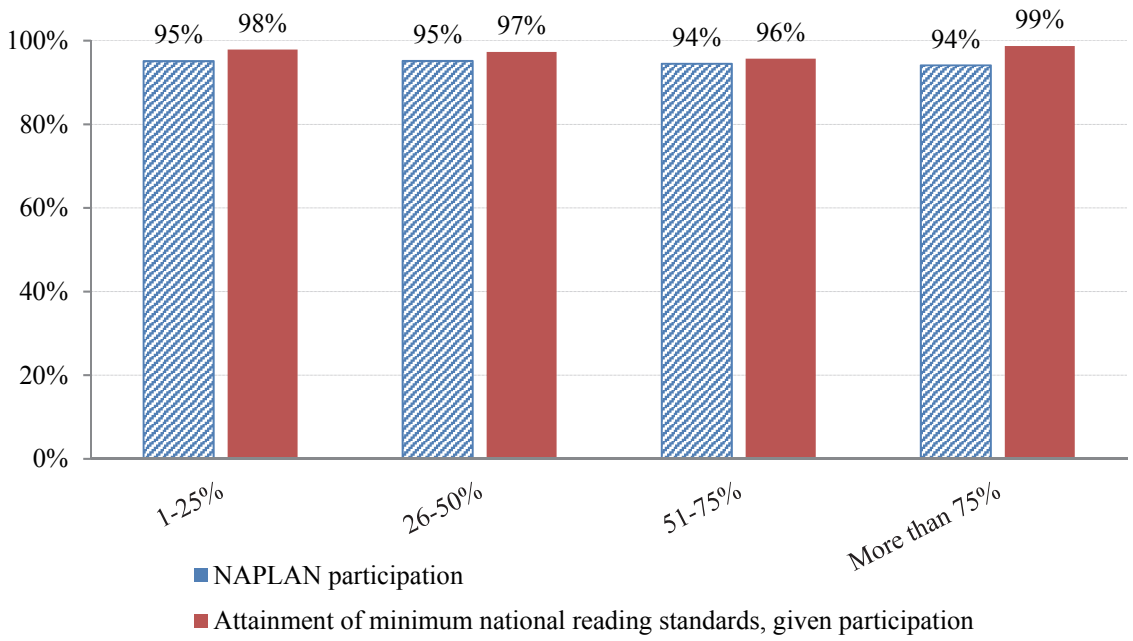
Students without disability

We are also able to estimate an equation like that of the previous section for students without a disability. In this case, the relationship between outcomes and funding is based on proportion of disability in the school Prep cohort that receives funding, other than the student.

We find no evidence that the school-level rate of receipt of targeted PSD funding among Prep students with disability impacts on the participation or academic achievement of students

without disability. Results in Figure 6 show consistently high rates of participation and attainment of national standards associated with different rates of targeted funding. These results also hold when we estimate regression models using in individual student NAPLAN scores instead of a binary measure of attainment of minimum national standards.

Figure 6. Estimated Year 3 NAPLAN outcomes associated with targeted PSD funding rates among Victorian public school children without an identified AEDC disability in Prep



6. Conclusions

The educational outcomes of people with disability are known to fall short of those without disability, which compounds the difficulties they face in participating in the workforce and more broadly in the community. Given that their cognitive and language skills are, on average, more than twice as likely to be in the bottom quarter in the state when commencing school, efforts to support their learning should be directed early-on in their schooling. In this study, we provide the first quantitative evidence on the allocation of targeted funding and outcomes of students who receive targeted funding under the Victorian government's Program for Students with Disability (PSD).

Our results suggest that any move to an alternative model of funding that is based on learning needs, as defined by student capabilities when in their first year of school, is likely to be associated with a large expansion of students who receive targeted funding. Based on the

language and cognitive development of Victorian mainstream public-school Preps, we find that while most of those who receive ongoing funding (levels 1-4) are in the bottom quarter in the state (415 out of 593), they represent only 17% of all Preps (415 out of 2,442) with disability who are developmentally in the bottom quarter in the state. This reflects the use of diagnostic criteria to determine eligibility for targeted PSD funding, rather than criteria based on learning needs. The rates of ongoing targeted funding for those in the bottom quarter with behavioural/emotional problems, visual and speech impairments are particularly low — 15 out of 391; 1 out of 481; 3 out of 822 are funded respectively. This compares with 351 out of 714 children with learning impairments who are developmentally in the bottom quarter in the state.[15]

As well as scope for extension, we also find evidence that administrative complexities may impede the receipt of targeted PSD funding. In particular, we observe large differences in the rate of receipt for children with disability across schools. We find that attending a school where more than a quarter of the first year students have targeted funding increases the individual chances of receiving targeted funding by around 10% on average (but can be as high as 29%), regardless of the student's capabilities and impairments and other school factors. While we cannot rule out an alternative explanation that funded students are concentrated in particular schools because of unobserved differences related to the criteria for targeted funding, sensitivity tests suggest that this is unlikely. Further investigations into the reasons for the apparent differences in school-level funding rates may be warranted, especially differences in funding in the first year of school, a period where it likely to make the most difference.

Results presented in this study suggest that the exemptions granted to children with disability from sitting NAPLAN is an impediment to evaluating the effectiveness of targeted PSD funding. We estimate that the continual receipt of targeted funding from Prep is associated with a 28% lower chance of sitting NAPLAN in Year 3, independent of observed student capabilities and impairments. When we consider the rates of NAPLAN participation associated with loosing and gaining targeted funding between 2012 and 2015, states that are likely to be associated with being on the margin of funding, those who gain targeted funding

[15] It should be born in mind that programmatic PSD funding supports the Language Support Program to assist teachers in meeting the needs of students with language difficulties.

exhibit a 22 percentage point lower participation rate than those who lose it. A possible interpretation is that the receipt of targeted funding acts as a highly visible label of disability, which principals use to exclude students to boost their school's average NAPLAN scores.

As well as limiting the accountability of targeted funding, such actions may harm student learning in a number of ways. First, by exempting students who receive targeted funding, principles emphasise student impairments over their capacity to learn, which may affect their self-efficacy and motivation to learn. Second, exempting students with disability from NAPLAN may reduce the incentive to use targeted funding effectively to improve the learning outcomes of students with disability. Finally, exempting students also limits the opportunity for teachers to compare funded student progress against the trajectories of similarly disadvantaged students nationally, which is important for evaluating school programs.

A possible response might be to remove the NAPLAN exemption, but with accompanying measures to prevent schools from responding by excluding students with disability from enrolment. Such a measure may be reporting NAPLAN scores as average trajectories according to different starting points in the distribution.

Given the highly selective nature of funded students who sit NAPLAN (204 out of 593), it is difficult to make any firm conclusions about the relationship between targeted funding and academic achievement. Among those who sit NAPLAN, we find no difference in the attainment of minimum national NAPLAN standards in reading associated with the receipt of targeted funding, controlling differences in a range of observable student characteristics. This result is difficult to interpret because recipients of targeted funding who sit NAPLAN are likely to be different to students from the comparison group who sit NAPLAN in ways that we cannot observe in our data, but which are likely to impact upon their achievement. For example, recipients of targeted funding who are not exempted may be from schools where there is little between-school competition and impetus to improve NAPLAN scores, which in itself may impact upon NAPLAN scores of those who sit the test. Given that NAPLAN was the only outcome variable available at the time of analysis, we are unable to conclude whether targeted funding has improved the academic outcomes of students or whether extending funding would improve the outcomes of new recipients.

As discussed in the introduction, when comparing outcomes between those who do and do not receive targeted funding, it is possible that differences in outcomes may be partly related

to differences in student characteristics, especially differential capabilities. While we are able to use rich data and multivariate econometric techniques to control for these differences, there remains a risk that some of the differences in outcomes remain uncontrolled for. This may be because the controls that we use, such as the AEDC language and cognitive skills domain score, do not fully control for differences in severity of disability or because there are other factors that affect outcomes, such as school-level factors, that are not observed in our data. To the extent that there are differences in outcomes related to uncontrolled-for factors between the two groups, then our findings may not be completely accurate. It is impossible to know the extent to which our results may be biased. For this reason, results presented in this study represent a first-step in understanding the outcomes from targeted funding.

For the future, to estimate true causal estimates, we recommend analysis based on a comparison between groups that are at the margin of funding; that is, a comparison of outcomes of those who just met the targeted funding criteria and those who applied and just missed out, known as regression discontinuity design (RDD). This would require the linking of initial assessment information for those who did and did not receive funding. An issue with this approach is that it only estimates causal impacts for students on the margin of funding, which is not necessarily indicative of outcomes for all funded students. To compliment RDD, another approach would be to examine differences in the individual Year 7-9 trajectories of students who gain or lose funding at the Year 6-7 review compared to those who maintain funding. This would require linking of academic performance measures between primary and secondary school with PSD information, including initial assessment information, funding levels and outcomes of the Year 6-7 review. We also recommend the linking of other measures (besides NAPLAN) to PSD information to better gauge outcomes from targeted funding. These include performance in AUSVELS and student engagement as measured in student satisfaction surveys, attendance records, school completion and post-school transitions observed in *On Track*.

Appendix A: Supporting material

Table A1. Criteria for funding under the PSD 2016

Category	Criteria
1. Physical disability	**A** A significant physical disability; **AND/OR** **B** A significant health impairment; **AND** **C** Requires regular paramedical support.
2. Visual impairment	**A** Visual acuity less than 6/60 with corrected vision; **OR** **B** That visual fields are reduced to a measured arc of less than 10 degrees.
3. Hearing impairment	**A** A bilateral sensori-neural hearing loss that is moderate/severe/profound; **AND** **B** The student requires intervention or assistance to communicate
4. Severe behaviour disorder	**A** Student displays disturbed behaviour to a point where special support in a withdrawal group or special class/unit is required; **AND** **B** Student displays behaviour so deviant and with such frequency and severity that they require regular psychological or psychiatric treatment; **AND** **C** The severe behaviour cannot be accounted for by: Intellectual Disability, Sensory (vision, hearing), Physical and/or Health issues, Autism Spectrum Disorder or Severe Language Disorder; **AND** **D** A history and evidence of an ongoing problem with an expectation of continuation during the school years.
5. Intellectual disability	**A** Sub-average general intellectual functioning which is demonstrated by a full-scale score of two standard deviations or more below the mean score on a standardised individual test of general intelligence; **AND** **B** Significant deficits in adaptive behaviour established by a composite score of two standard deviations or more below the mean on an approved standardised test of adaptive behaviour; **AND** **C** A history and evidence of an ongoing problem with an expectation of continuation during the school years.
6. Autism Spectrum Disorder	**A** A diagnosis of Autism Spectrum Disorder; **AND** **B** Significant deficits in adaptive behaviour established by a composite score of two standard deviations or more below the mean on an approved standardised test of adaptive behaviours; **AND** **C** Significant deficits in language skills established by a comprehensive speech pathology assessment demonstrating language skills equivalent to a composite score of two standard deviations or more below the mean.

7. Severe language disorder with critical educational needs	**A** A score of three or more standard deviations below the mean for the student's age in expressive and/or receptive language skills on TWO of the recommended tests **AND** **B** The severity of the disorder cannot be accounted for by hearing impairment, social emotional factors, low intellectual functioning or cultural factors; **AND** **C** A history and evidence of an on-going problem with the expectation of continuation during school years; **AND** **D** A non-verbal score not lower than one standard deviation below the mean on one comprehensive intellectual test, with a statistically significant ($p<0.05$) difference between verbal (VCI) and non-verbal (VSI/PRI) functioning (VCI<VSI/PRI); **AND** **E** Demonstrated critical educational needs equating to Program for Students with Disabilities funding levels three and above as determined by the validated results of the Educational Needs Questionnaire.

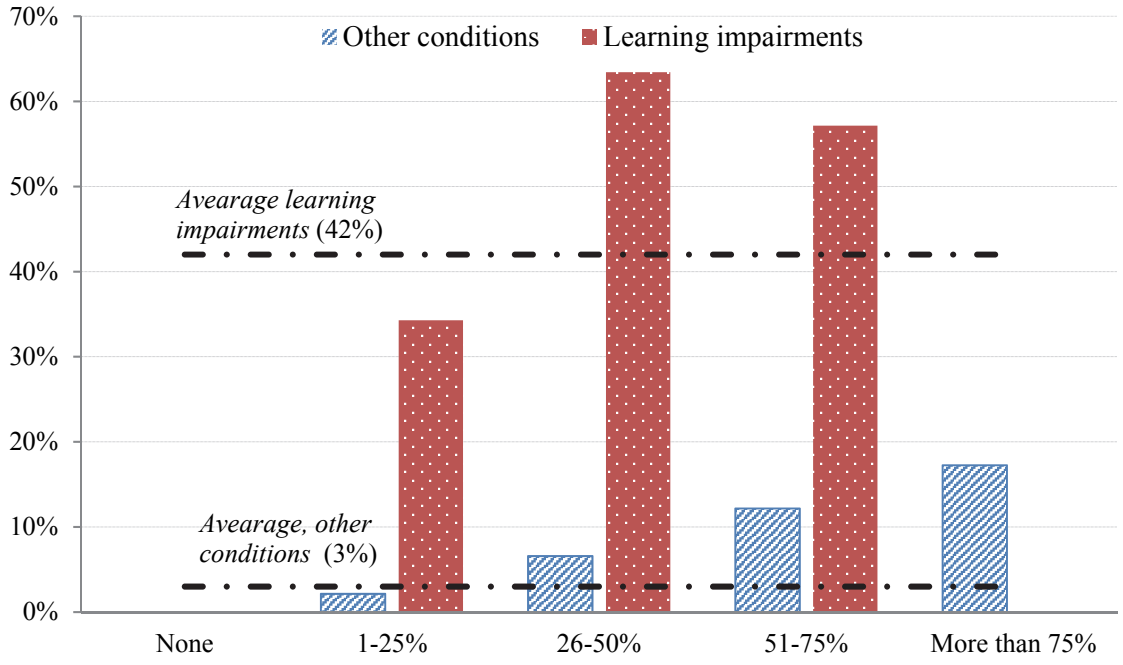
Source: Victorian Department of Education and Training (2016). Program for students with disabilities — operational guidelines for schools 2017. www.education.vic.gov.au/Documents/about/programs/needs/psdguidelines.docx (accessed May 2016).

Table A2. School Prep disability funding rate by disability count[a]

PSD funding rate among students with disability	Number of 2012 Prep students in a school that are identified in AEDC as having a disability				
	1-5 students	6-10 students	11-15 students	16-20 students	More than 20
0%	357	131	48	12	11
1-25%	60	112	76	45	22
26-50%	66	37	15	3	4
51-75%	2	0	1	0	0
More than 75%	35	1	0	0	0
Total	520	281	140	60	37

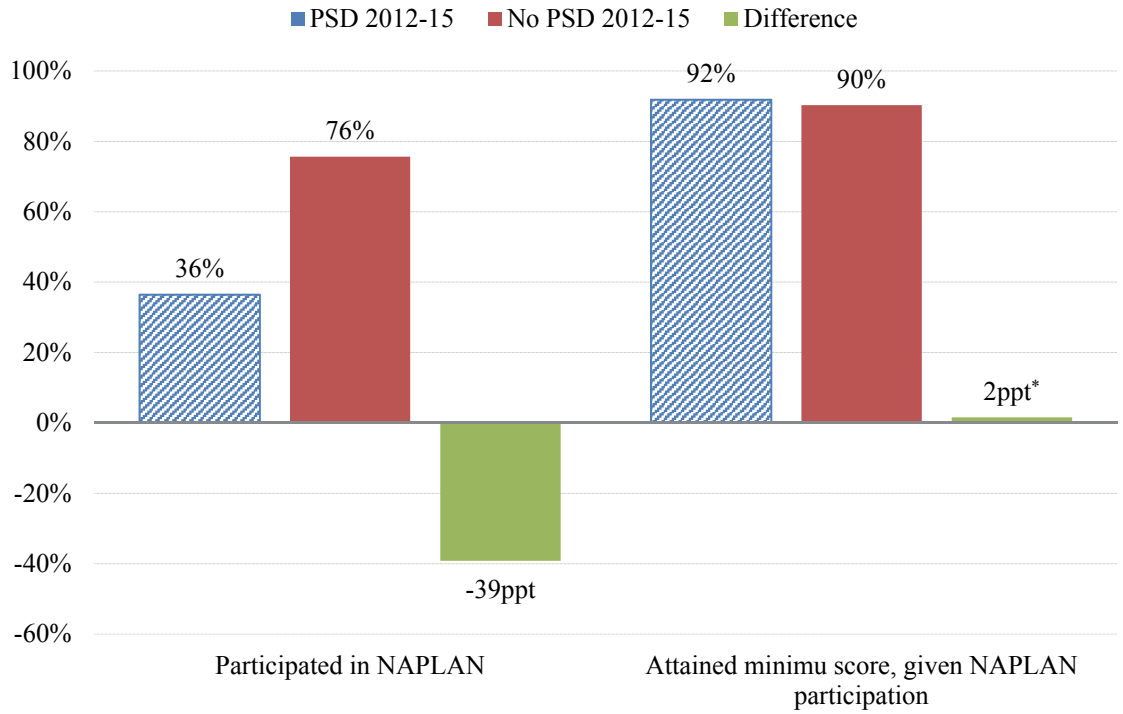
[a]There are 114 schools out of 1,152 without any Preps with disability.

Figure A1. Estimated chances of individual receipt of targeted PSD receipt in 2012-15 associated with the school Prep cohort rate of receipt amongst Victorian public school Preps with an AEDC disability



Note: include both those who have a learning impairment, regardless of whether they have any other condition. No estimate is available for the chance of PSD receipt for those with learning impairments in schools where three-quarters of more of children are funded because no cases are observed in the data.

Figure A2. Estimated Year 3 NAPLAN participation rate and attainment rate of national minimum standards associated with the receipt of PSD funding among Victorian public school children with AEDC identified disability in Prep, propensity score matching



Note: the bars for PSD 2012-15 and No PSD 2012-15 represent the estimated average NAPLAN participation rate and national standard attainment rate associated with the receipt of PSD and no receipt of PSD respectively, controlling for differences in student capacity and impairments, attended school traits and traits related to student socio-economic background between the two groups.

*Not statistically different from zero.

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POSTERA CRESCAM LAUDE
THE UNIVERSITY OF
MELBOURNE
MELBOURNE
INSTITUTE