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Enforcing Compulsory Schooling by  
Linking Welfare Payments to School Attendance:  
Lessons from Australia's Northern Territory

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# **Enforcing Compulsory Schooling by Linking Welfare Payments to School Attendance: Lessons from Australia's Northern Territory\***

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## **Abstract**

Efforts to enforce compulsory schooling by linking welfare assistance to school attendance are rarely successful in themselves. One reason is a lack of credibility: targeted families may anticipate that welfare administrators will be reluctant to withdraw support when attendance does not improve. Australia's School Enrolment and Attendance through Welfare Reform Measure (SEAM) demonstrates the impact of a credible threat. Targeting the Indigenous population of the Northern Territory, its credibility stemmed from the extreme circumstances created by the Northern Territory Emergency Response Act and from the troubled history of race relations in Australia. We show, using a difference-in-difference analysis of standardized test data (NAPLAN), that SEAM had a substantial, immediate impact: in its first year it triggered an increase in test participation rates of 16-20 percentage points over pre-SEAM levels; and it significantly increased the share of tested cohorts achieving national minimum standards by 5-10 percentage points. However, welfare payments were rarely withheld from truant families and participation rates fell in subsequent years, though remaining significantly above pre-SEAM levels. This suggests that initiatives such as SEAM will not be fully effective in the longer term unless accompanied by measures that increase parents' and children's appreciation of the value of schooling.

**JEL classification:** I25, I38

**Keywords:** Australia, Indigenous population, Northern Territory Emergency Response, SEAM, compulsory schooling, linking school attendance to welfare payments

## 1. Introduction

All advanced, industrialized countries have compulsory schooling laws with high levels of compliance; non-compliance is generally limited to a small fraction of families, many of them living in deprivation. Making sure these children attend school regularly is a key element in breaking the intergenerational chain of poverty, yet full enforcement often proves difficult. Options for intervention are limited: removing truant children from their families is an extreme measure that cannot be implemented except in special cases; and providing parents with positive inducements to send their children to school, such as the conditional cash transfers (CCT) now offered in some developing countries (Rawlings and Rubio, 2005) are expensive and unpopular in developed countries inasmuch as they reward parents of truant children for complying with the law.<sup>1</sup>

One policy approach implemented in the United States in a number of settings involves linking welfare payments to school attendance, on the assumption that the threat of withholding payments will be sufficient to deter truancy. Reviewing such programs, Campbell and Wright (2005), conclude that unless accompanied by case management resources, they do not significantly improve attendance. In many instances, caseworkers find valid reasons for non-compliance; in others, targeted families were unaware of the threat of withholding welfare payments. In general, welfare administrators appreciate that withholding payments will harm the very children they are trying to help and resist following through, and targeted families, realizing this, do not respond. This raises the question, whether more credible threats might achieve different results.

Australia's School Enrolment and Attendance through Welfare Reform Measure (SEAM) provides a unique opportunity to answer this question. SEAM threatened to withhold welfare payments from Indigenous parents in the Northern Territory whose children failed to meet school attendance requirements. It was implemented against the backdrop of the Northern Territory Emergency Response (NTER), an intervention directed at the Northern Territory's Indigenous population in response to allegations of child sex abuse in their communities, which involved a military presence and temporary suspension of Australia's Racial Discrimination Act (Broome, 2010).<sup>2</sup> While formally separate from the NTER, SEAM gained credibility from the heightened anxiety generated by the NTER, which was further reinforced by the living memory of yet severer, purportedly well-meaning

<sup>1</sup> Field experiments offering positive incentives for educational outcomes to disadvantaged students indicate that they can be effective (Levitt et al., 2012; Cook et al., 2014).

<sup>2</sup> The military component of the NTER was called "Operation Outreach."

measures to which Indigenous Australians had been subjected by Australian governments in the past.<sup>3</sup>

In this paper we estimate SEAM's impact on school attendance and learning achievement among the population of Indigenous children in the Northern Territory. To this purpose we apply a difference-in-difference analysis to data from the National Assessment Program—Language Arts and Numeracy (NAPLAN) on participation rates and test score averages in reading and numeracy, in grades 3, 5, 7 and 9, comparing the difference between Indigenous participation and performance in the Northern Territory and Indigenous participation and performance across Australia's states and territories, between 2008, the year before SEAM was implemented, and subsequent years to 2012.<sup>4</sup> Previewing our main results, we find that in 2009, the first year in which SEAM was implemented, test participation increased dramatically among Indigenous children in the Northern Territory, by 16-20 percentage points compared to pre-SEAM levels (in 2008) of about 70%, where no similar increase was witnessed among the Indigenous populations of Australia's other states and territories. Surprisingly, this sharp rise in participation rates did not lower test means, suggesting that the academic ability of those induced to sit the test by SEAM was similar, on average, to that of students who would have taken the test absent intervention. Consequently, in 2009 the share of each cohort achieving the minimum standard on these tests increased substantially, by 5 to 10 percentage points over its 2008 level of about 30%, where again no similar increase was witnessed among the Indigenous populations of other states and territories.

However, these achievements could not be sustained. The threat of withholding welfare payments from the remaining Indigenous parents whose children failed to meet school attendance requirements was not carried out except in a handful of cases; and as this was observed and became widely known, participation rates fell off. The following year, 2010, saw an erosion of about half the gains achieved the year before. By 2012, the last year in our study, participation rates had fallen substantially from their peak in 2009 but remained significantly above the baseline levels of 2008. However, nearly all the gains in the share of the cohort achieving minimum standard evaporated.

These findings demonstrate that a credible threat to link welfare payments to school attendance can substantially raise participation rates and learning achievement. Yet this increase could not be sustained even in the unique circumstances of the NTER, as the threat of withholding welfare

<sup>3</sup> The most extreme of these policies was the forced removal of Indigenous children from their families by Australian Federal and State government agencies, which continued until as recently as 1969. In 2008, then Australian Prime Minister Kevin Rudd issued a formal recognition and apology for what has come to be called "The Stolen Generations".

<sup>4</sup> We only had access to publicly available aggregate data. If individual-level data is released it will be possible to carry out more detailed analyses that may shed further light on this unique experience.

payments proved hollow. Of the parents induced by SEAM to send their children to school in 2009, some continued to do so in subsequent years, when they no longer felt threatened, but many did not. Presumably, they still did not see the value in conventional schooling—whether due to the importance they attached to traditional activities not well served by conventional education,<sup>5</sup> or because they saw limited opportunities for their children in the Australian labor market.

This indicates that even when threats to link welfare payments to school attendance are initially credible, the gains they achieve are largely temporary. In themselves, they programs offer at best an opportunity to demonstrate to parents that sending their children to school is worthwhile on its own merits. For them to have an effect in the longer term, parents' perceptions of the value of schooling must be changed.

The remainder of the paper is organized as follows: Section 2 briefly describes the Indigenous population in the Northern Territory; Section 3 describes the NTER and SEAM initiatives; Section 4 presents descriptive statistics on the impact of SEAM on education outcomes in the Northern Territory; Section 5 presents results of regression analysis of the data; and Section 6 concludes.

## **2. Indigenous Australians in the Northern Territory**

Indigenous Australians exhibit markedly weaker aggregate indicators of well-being compared to non-Indigenous Australians in many important dimensions such as life expectancy, education levels, health outcomes, employment, family and community violence, incarceration and freedom from poverty (Stephens, 2010; SCRGSP, 2011). The gap between Indigenous and non-Indigenous Australians is especially large in the Northern Territory, where a larger share of the Indigenous population lives in remote locations, and where they are an overwhelming majority and many maintain a traditional way of life.<sup>6</sup>

*Life expectancy.* The most recent estimates from the Australian Bureau of Statistics (ABS)<sup>7</sup> put the life expectancy of Indigenous Australian men at 67 years, twelve years less than the Australian

<sup>5</sup> Altman, Buchanan and Biddle (2006) describe the Indigenous economy of the Northern Territory as comprising a private sector, a public sector and a non-market customary sector, where the customary sector includes such activities as fishing and hunting, art and craft production, and meeting cultural responsibilities. Time spent in school may have a negative effect on productivity in the customary sector. We expand on this in Section 2.

<sup>6</sup> Their overall share of the population in the Northern Territory, 27% according to the 2011 census, is by far the highest of any Australian state or territory. A larger share of Indigenous Australians live in New South Wales, but they make up only 2.5% of its population. Indigenous Australians also own roughly half the land in the Northern Territory.

<sup>7</sup> [Life expectancy trends - Australia](#), Australian Social Trends, March 2011 (ABS cat. no. 4102.0)

average, and that of Indigenous Australian women at 73 years, ten years below average. The average life expectancy of an Indigenous man or woman in the Northern Territory is about 2 years less than the average Indigenous Australian—slightly less than the average life expectancy in Bangladesh.

*Education.* Participation in the National Assessment Program for Literacy and Numeracy (NAPLAN) in 2008, the year before SEAM was implemented, averaged over 90% for the Australian population at large; just under 80% for all Indigenous Australians; and about 70% for the Indigenous population of the Northern Territory (slightly more in grades 3 and 5; slightly less in grades 7 and 9).<sup>8</sup> In 2012, more than 1 in 5 Indigenous students in Australia performed below the national minimum standard in year 3 numeracy and reading compared to 1 in 30 non-Indigenous Australian students. At the same time, almost 60% of year 3 Indigenous students in the Northern Territory scored below the national minimum standard on the numeracy and reading component of NAPLAN; in grade 9 about 67% failed to meet minimum standards.

*Labor market outcomes.* Differences in aggregate labor market outcomes between Indigenous and non-Indigenous Australians are similarly arresting. Approximately 76% of non-Indigenous Australians participate in the labor force, and 72% are employed, while only 57% of Indigenous Australians participate in the workforce and only 48% are employed. The labor market participation rate for Indigenous Australians in the Northern Territory is even lower, 44%, according to the 2011 Labour Force Survey.<sup>9</sup> Nonetheless, the unemployment rate among the Indigenous population of the Northern Territory was among the lowest among Indigenous Australians. This was partly due to the Community Development Employment Project (CDEP), a work for welfare scheme that was especially common in remote areas, where approximately 80% of Indigenous persons in the Northern Territory live (Hunter and Gray, 2012).<sup>10</sup>

Altman, Buchanan and Biddle (2006) describe Indigenous employment in Australia as divided among three sectors: the private or market sector; the public sector (predominately CDEP); and the customary or informal sector, which includes activities such as hunting, fishing and gathering, production of art and crafts, and land, habitat and species management participation. Employment in the customary or informal sector is especially large in remote Indigenous communities, which

<sup>8</sup> NAPLAN national reports, <http://www.nap.edu.au/results-and-reports/national-reports.html>.

<sup>9</sup> Labour Force Characteristics of Aboriginal and Torres Strait Islander Australians, Estimates from the Labour Force Survey, 2011 (ABS cat. no. 6287.0)

<sup>10</sup> In July 2013 the Australian government replaced CDEP with the Remote Jobs and Communities Program (RJCP). While successive policy agendas have aimed to sharply reduce the gap in employment outcomes, one estimate suggests that “labour force participation rates would take over a century to converge if the trends for the period 1971-2006 were to persist” (Altman, Biddle and Hunter, 2008)

account for a disproportionately large fraction of the Indigenous population of the Northern Territory. Ignoring employment in this third, non-market sector, as ABS statistics do, effectively underestimates the level of employment among the Indigenous population in the Northern Territory. Recognizing its importance leads to a more realistic assessment of the opportunity cost of conventional schooling and hence to a further downward revision of the already low returns to schooling that Indigenous families in remote areas can reasonably anticipate.

Table 1, drawn from the National Aboriginal and Torres Strait Islander Social Survey (NATSISS) for 2008, illustrates the distinct cultural identity and socio-economic circumstances of Indigenous Australians living in the Northern Territory, compared to other large Indigenous populations in Western Australia, Queensland, New South Wales and South Australia. Indigenous Australians in the Northern Territory have stronger ties to traditional Indigenous culture and ways of life, and are less likely to report they or a relative had been forcibly removed from their natural families. In some respects—psychological distress, disability, employment rates—they are similar to other Indigenous Australians, but Indigenous Australians in the Northern Territory have less formal schooling and less access to money income, and hence are less socially mobile within Australian society at large.

TABLE 1—SELECTED CHARACTERISTICS OF THE INDIGENOUS POPULATION, BY STATE/TERRITORY

	Northern Territory	Western Australia	Queensland	New South Wales	South Australia
Speak Indigenous language	62.6	22.6	19.1	3.2	25.9
Identify with tribal group	85.4	62.3	64.2	51.7	72.7
Live on homelands	40.5	29.5	16.7	29.6	17.9
Involved in cultural events	81.3	70.0	65.2	55.1	65.0
Has crisis support	85.2	90.1	84.6	92.0	90.8
Removed from natural family	4.8	11.0	7.2	7.7	11.9

Source: National Aboriginal and Torres Strait Islander Social Survey (NATSISS), 2008.

### 3. The perception of SEAM within the context of the NTER

The impact of the School Enrolment and Attendance through Welfare Reform Measure (SEAM) on education outcomes, on which we focus in this paper, can only be understood against the backdrop of the controversial Northern Territory Emergency Response (NTER) or “Northern Territory Intervention” initiated shortly before it, for although SEAM was not part of the NTER, it was the operational context of the NTER that lent SEAM much of its initial credibility.



The NTER was implemented by the Liberal-National Coalition government under John Howard in 2007, during the lead-up to the federal election that year. The initial response deployed additional police and military units in the Northern Territory,<sup>11</sup> as an immediate response to allegations of widespread child neglect and sexual abuse in Indigenous communities outlined in the publication of *Little Children are Sacred* (Wild and Anderson, 2007).

The NTER imposed government control of Indigenous communities for a five-year period and introduced a range of measures aimed at addressing the abuse of children and women and narrowing the gaps in economic opportunity between Indigenous and non-Indigenous Australians. These measures included, among others, deployment of additional police and military to affected communities, restrictions on alcohol and pornography, reforms that limited Native land rights, added Commonwealth funding for community services, and sequestering 50 percent of all welfare payments for basic needs—racially targeted measures that required temporary suspension of the Racial Discrimination Act (see Broome (2010) for a comprehensive discussion). The Australian Defense Force presence ended in 2008 but the Intervention continued until August 2012 through various policy initiatives (Altman and Russell, 2012), and has since been replaced by the Stronger Futures Policy. The NTER was supported by subsequent Labor governments under both Kevin Rudd and Julia Gillard and enjoyed a strong bi-partisan mandate. But many Indigenous leaders spoke out publicly against it, labeling it ‘authoritarian’ and ‘paternalistic.’<sup>12</sup>

SEAM was seen as a key element in narrowing the economic gap between Indigenous and non-Indigenous Australians and interrupting the intergenerational transmission of poverty, specifically by raising school attendance rates, which were very low among Indigenous Australians in the Northern Territory: an average attendance rate of 78% in 2008 compared to a national average of 91% and yet larger differences in standardized test (NAPLAN) participation rates. It aimed to achieve this purpose by linking income support payments to school attendance.

<sup>11</sup> The Australian Defence Force (ADF) began “Operation Outreach” on 27 June 2007 and deployed approximately 600 ADF personnel, about 400 of them soldiers (<http://www.defence.gov.au/opEx/global/opoutreach/index.htm>). This manner of intervention in the Northern Territory would not have been constitutionally possible in Australia's states.

<sup>12</sup> Broome (2010) describes this public response, noting an open letter against the intervention signed by sixty Aboriginal community and church organizations, in *The Age* newspaper. Support for the NTER, was voiced by some Indigenous leaders, notably women such as Professor Marcia Langston, who saw it as necessary for protecting the rights of Indigenous women and children in view of the failure of the Northern Territory government to address these issues effectively. <http://www.abc.net.au/news/2008-02-08/trapped-in-the-aboriginal-reality-show/1036918>.

TABLE 2—TARGET POPULATIONS IN SEAM SITES, 2009

Location	Total Population	Indigenous population	Parents in SEAM	Children in SEAM
Katherine Township	9208	2365	354	611
Katherine Town Camps	-	-	111	191
Hermannsburg	623	537	87	125
Wallace Rockhole	68	63	15	21
Tiwi Islands	2579	2267	203	336
Wadeye	2112	1927	219	374

*Notes:* Population statistics come from the 2011 Australian Census and the target numbers come from DEEWR (2011). The total population for Katherine Town Camps was not reported in publicly available census data.

Administered by the Department of Families, Community Services and Indigenous Affairs (FaHCSIA), SEAM was announced in June 2008, and began in January 2009. In its first year, it formally targeted a small population of parents receiving Centrelink (welfare) payments with children in one of fourteen schools in six trial areas. Table 2 shows the distribution of children and parents across the six trial areas targeted by SEAM in 2009, along with population statistics from the Australian Bureau of Statistics (ABS). Katherine Town Camps is an exclusively Indigenous community located near Katherine Township, a regional center in the Northern Territory. Overall, 989 parents and 1,658 children were deemed within the scope of SEAM in 2009 (DEEWR, 2011), a small fraction of the overall Indigenous population of the Northern Territory.

Government reports published by the Department of Employment, Education and Workplace Relations (DEEWR) indicate that high awareness of the SEAM program among parents was accompanied by a high level of misinformation about how the program worked and whom it targeted (DEEWR, 2011). According to these reports, “parents and communities had limited understanding of the details of SEAM, and this was compounded by misinformation”. The report cited several common misconceptions among parents and community members that heightened its effectiveness not only among its target population but among the entire Indigenous population of the Northern Territory:

- It was directed at Indigenous children in remote areas.
- All carers (including grandmothers and aunts) would have their payments suspended if they were caring for a truant child.
- All Indigenous families in trial locations were subject to SEAM, including waged families and families participating in CDEP.
- Non-compliance with SEAM would trigger immediate suspension of payments, rather than requiring a compliance period as was actually the case.

In fact, of the 989 parents deemed within scope of the SEAM program in 2009 none had their payments suspended for failure to comply (DEEWR, 2011). The stated policy goal of SEAM was to increase enrolments, and 918 parents (1604 children) were sent enrolment notification letters which requested they provide their child's school enrolment details to Centrelink within 14 days. According to the DEEWR evaluation report the overall non-compliance rate was 170 parents (286 children). Of these, 56 parents (84 children) were sent enrolment warning notices, the final step before having their benefits suspended. The majority complied but eleven chose to move out of the scope of the program (effectively this was the most severe sanction for non-compliance in 2009). The strong threats implicit in the information campaign that accompanied the initial implementation in 2009 were not carried out.

#### **4. The impact of SEAM on educational outcomes: Descriptive statistics**

While raising school enrollment and attendance rates was the immediate target of SEAM its ultimate goal was to have a positive impact on learning achievement. We did not have access to individual enrolment or attendance data that would have allowed us to track changes in Indigenous attendance rates. However, we are able to estimate the impact of SEAM on learning outcomes from NAPLAN participation and achievement data.<sup>13</sup> Tables 3 and 4 presents comparative summary statistics on NAPLAN outcomes in two knowledge domains, reading and numeracy, averaged over four grade levels (3, 5, 7, and 9), in five successive years: from 2008, the year before SEAM was implemented to 2012. They illustrate vividly both the immediate impact, in 2009, of the perceived threat of SEAM on education outcomes in the Northern Territory, and the abatement of this effect in subsequent years as it became increasingly apparent that the threat of withholding welfare payments was not being carried out.

Three indicators are presented in these tables: the participation rate, the share of students in the cohort above minimum standard, and the pass rate. The participation rate is defined as the percentage of students participating in the NAPLAN test (including students exempted by the school) as a percentage of the total number of students in the year level.<sup>14</sup> The share of students in the cohort

<sup>13</sup> NAPLAN comprises five knowledge domains (numeracy, reading, grammar, spelling and writing). Each year, in mid-May, the Australian Curriculum Assessment and Reporting Authority (ACARA) administers tests in each domain to all Australian students in grades 3, 5, 7, and 9. The data reported here are from the 2008-2012 NAPLAN National Reports published by ACARA, and available at <http://www.nap.edu.au/results-and-reports/national-reports.html>.

<sup>14</sup> Non-participating students are students classified as absent or withdrawn (by the parents).

above minimum standard is defined for grade level  $g$  and knowledge domain  $d$  in year  $t$  (say, grade 7 numeracy in 2010) as:

$$(1) \quad S_{gdt} = (P_{gdt} - M_{gdt}) / T_{gt}$$

where  $P_{gdt}$  is the number of students in grade  $g$  participating in the test in knowledge domain  $d$  in year  $t$ ,  $M_{gdt}$  is the number of students scoring below minimum standard on that test, and  $T_{gt}$  is the total number of students in grade  $g$  in year  $t$ . This is distinct from our third indicator, the pass rate, which is the percentage of students participating in the test who scored above minimum standard. It is defined as

$$(2) \quad R_{gdt} = (P_{gdt} - M_{gdt}) / P_{gdt}$$

TABLE 3—NAPLAN OUTCOMES IN READING, AVERAGED OVER ALL GRADE LEVELS, %

	Participation			Above minimum standard			Pass rate		
	All non-Indig.	All Indig.	Indig. In NT	All non-Indig.	All Indig.	Indig. In NT	All non-Indig.	All Indig.	Indig. In NT
2008	96	87	67	92	61	22	95	70	33
2009	96	89	86	92	65	31	96	73	36
2010	96	87	76	92	64	30	96	73	39
2011	96	87	77	92	65	30	96	75	39
2012	95	86	74	91	63	27	96	73	36

Source: The 2008-2012 NAPLAN National Reports, <http://www.nap.edu.au/results-and-reports/national-reports.html>. Entries are averages over the four cohorts in each year: grades 3, 5, 7 and 9.

TABLE 4—NAPLAN OUTCOMES IN NUMERACY, AVERAGED OVER ALL GRADE LEVELS, %

	Participation			Above minimum standard			Pass rate		
	All non-Indig.	All Indig.	Indig. In NT	All non-Indig.	All Indig.	Indig. In NT	All non-Indig.	All Indig.	Indig. In NT
2008	96	86	68	97	66	32	97	77	48
2009	96	88	85	97	67	38	97	77	45
2010	95	87	75	97	66	32	97	76	43
2011	95	86	76	97	68	38	97	79	49
2012	95	85	72	96	64	30	96	75	43

Source: The 2008-2012 NAPLAN National Reports, <http://www.nap.edu.au/results-and-reports/national-reports.html>. Entries are averages over the four cohorts in each year: grades 3, 5, 7 and 9.

The pattern of change in participation rates is similar for both knowledge domains. First, a sharp increase in 2009—of 19 percentage points in reading and 17 in numeracy—without parallel for Australia as a whole, or for the general Indigenous population. This change nearly erased, in a single year, the difference between the participation rates of the Indigenous population in the Northern Territory and in the entire Indigenous population of Australia, illustrating the dramatic effect that can be achieved by a credible threat to link welfare payments to schooling.

However, though the threat was initially perceived to be credible it was not actually carried out, and as this came to be known it resulted in an immediate falling off in participation rates: ten percentage points in each domain in 2010, with smaller declines in subsequent years, leaving participation rates in 2012, in reading and numeracy, respectively seven and four percentage points above their 2008 pre-SEAM levels.

Surprisingly, this dramatic immediate rise in participation rates did not trigger commensurate declines in pass rates—the share of test takers achieving minimum standard levels—as one might expect. The pass rate in reading actually rose by three percentage points, mirroring a similar rise in the general Indigenous population, while the pass rate in numeracy fell by the same measure. Subsequent years saw yet further gains in reading pass rates and fluctuating changes in numeracy. We take this as indicating that those who were not taking NAPLAN tests absent SEAM, but were induced to do so by SEAM, had similar academic ability, especially in reading, to students who participated in NAPLAN before SEAM was implemented.

This rise in participation rates without a commensurate decline in pass rates resulted in immediate increases in the share of the Indigenous cohort in the Northern Territory achieving minimum standard over pre-SEAM 2008 levels: an increase in 2009 of ten percentage points in reading, from 21% to 31%, and six percentage points in numeracy, from 32% to 38%. These are dramatic increases in measured achievement learning, gained in only one year. However, again, we see much of these gains eroded in subsequent years. The gain in reading in 2012, of six percentage points over the base level, remains substantial, while the share achieving minimum standard in numeracy fluctuates strongly, above and below 2008 levels, from year to year. These patterns are illustrated graphically for each grade level in Figures 1-4. The underlying data are provided in the appendix.

Figure 1 shows trends in the percentage of Indigenous students participating in the NAPLAN reading test in the Northern Territory, marked by the black line, compared to Indigenous students in Australia's other states and territories, marked by gray lines. In 2008, prior to the implementation of SEAM, participation in the NAPLAN reading test among Indigenous students in the Northern Territory was the lowest in Australia, regardless of year level. The spike in participation in 2009 is visually obvious in Figure 1 for all year levels, with the largest increase in grades 5 and 7 and the

smallest in grade 9; in 2009, the Northern Territory's Indigenous participation share is no longer the lowest of all states and territories in any grade. However, this increase falls off immediately, in 2010, in all grades, as a result of which the Northern Territory's Indigenous participation share is again the lowest of all states and territories in each grade and each year from 2010 on. Nonetheless, in all grade levels, participation rates in NAPLAN reading tests in 2012 are markedly higher than in 2008.

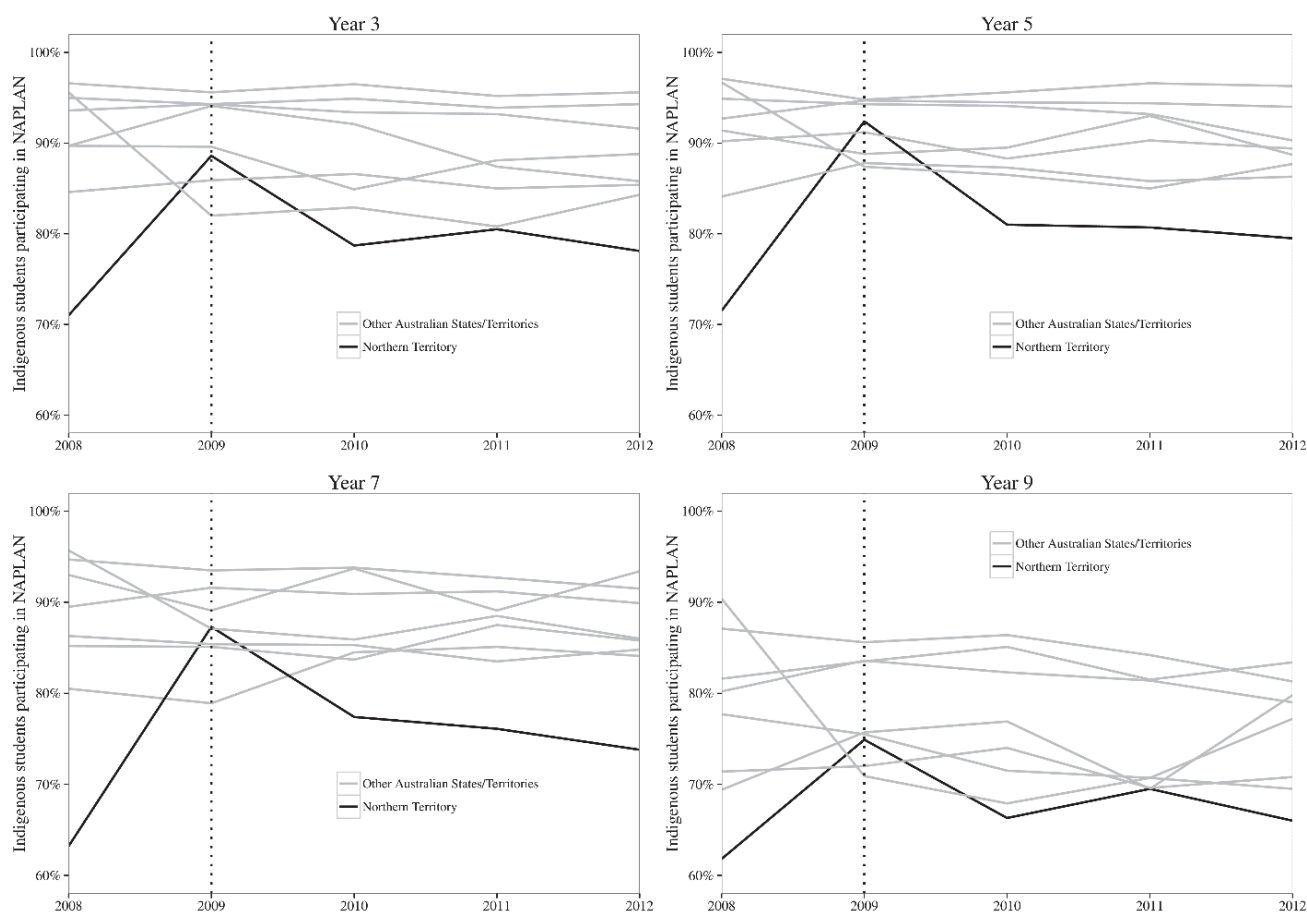


FIGURE 1. TRENDS IN NAPLAN READING TEST PARTICIPATION BY STATE/TERRITORY

Source: NAPLAN National Reports, 2008-12, <http://www.nap.edu.au/results-and-reports/national-reports.html>.

Figure 2 shows trends in the percentage of Indigenous students participating in the NAPLAN numeracy test in each grade level and year, again comparing the Northern Territory to other states and territories. The same dynamic patterns observed for participation rates in reading tests are again apparent here: a sharp rise in 2009 followed by a sharp immediate decline in 2010, and further gradual decline in subsequent years to a final level, in 2012, higher than the base level in 2008. Again this pattern is unique to the Northern Territory; no other state or territory exhibits a similar pattern.

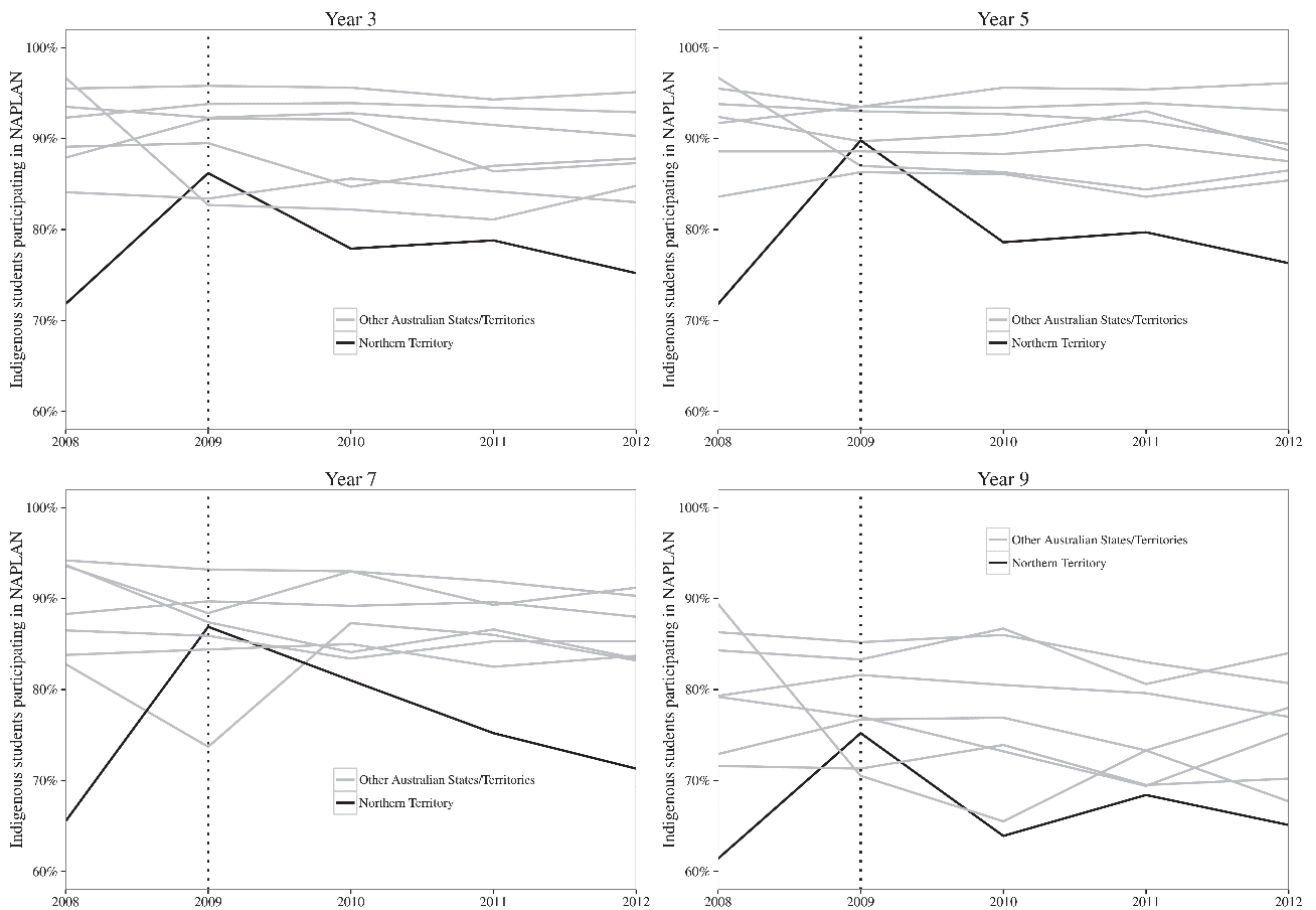


FIGURE 2. TRENDS IN NAPLAN NUMERACY TEST PARTICIPATION BY STATE/TERRITORY

Source: NAPLAN National Reports, 2008-12, <http://www.nap.edu.au/results-and-reports/national-reports.html>.

Figures 3 and 4 present time trends in the percentage of Indigenous students above minimum standard, respectively in reading and numeracy, for each grade level, comparing the Northern Territory (the black line) to Australia's other states and territories (the gray lines). We find significant differences between the two knowledge domains and among grade levels. In reading we find a substantial increase of about ten percentage points, from about 20% to about 30%, in grades 3, 5 and 7, followed by a very mild decline that leaves much of the initial gain intact, while grade 9 shows no systematic effect. Trends in numeracy, in Figure 4, are less pronounced with more fluctuation. Nonetheless we see here, too, increases in the share reaching minimum standard from 2008 to 2009 in grades 5, 7 and 9 (the largest increase is in grade 5), followed by a decline in 2010; there is no increase for grade 3

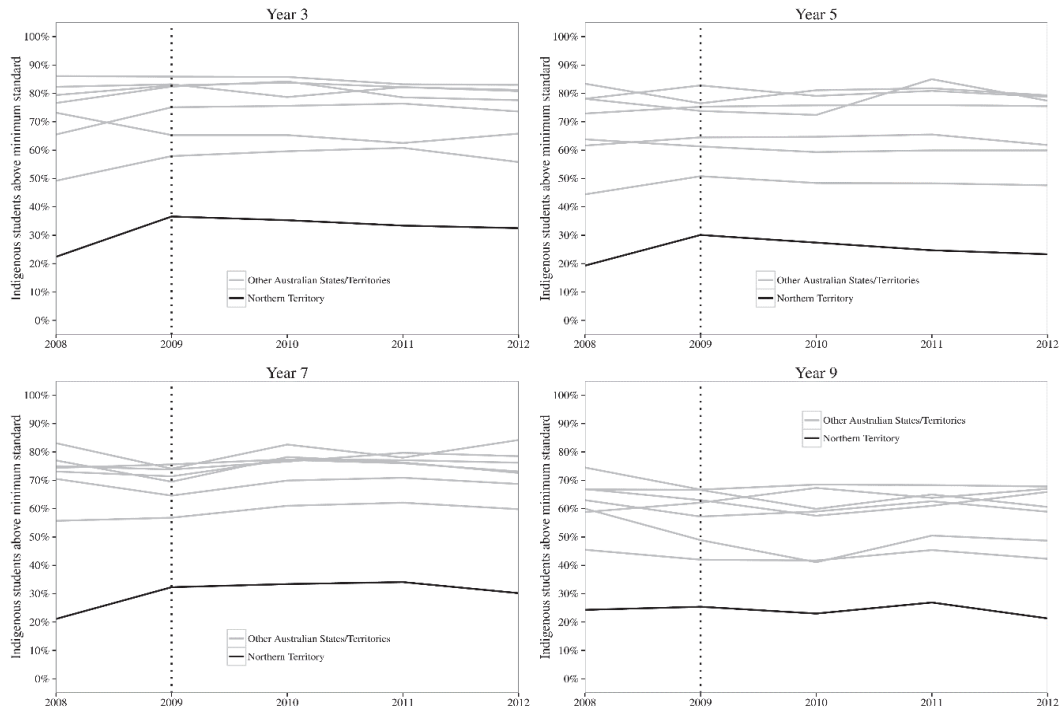


FIGURE 3. INDIGENOUS STUDENTS ABOVE MINIMUM STANDARD IN READING BY STATE/TERRITORY

Source: NAPLAN National Reports, 2008-12, <http://www.nap.edu.au/results-and-reports/national-reports.html>.

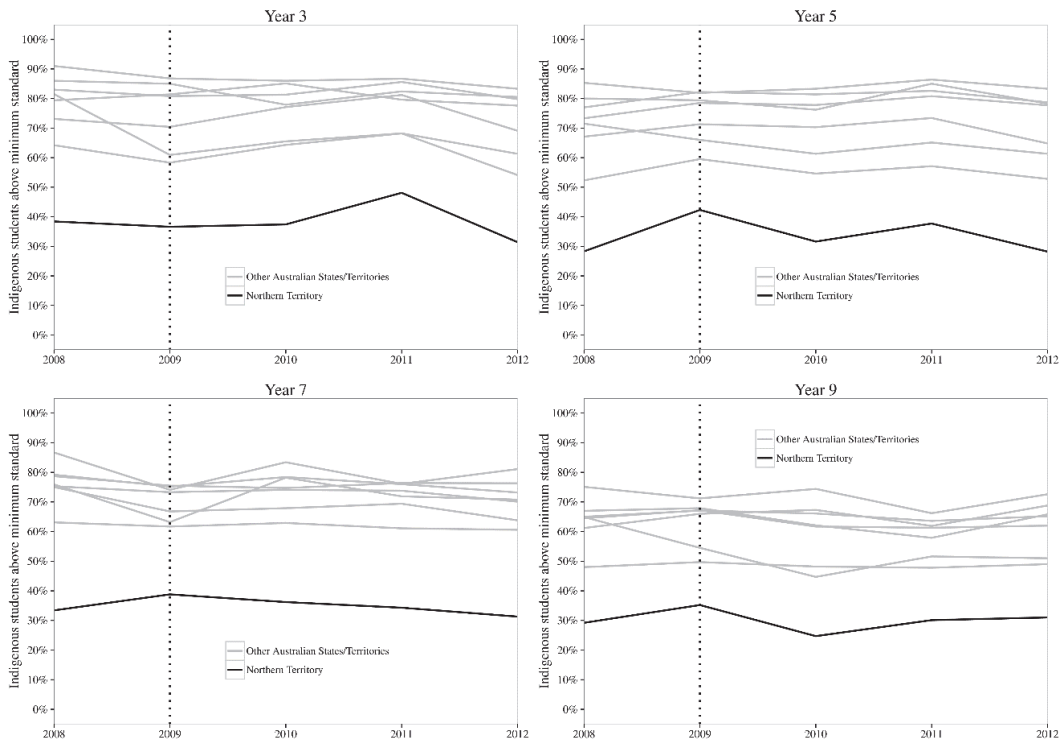


FIGURE 4. : INDIGENOUS STUDENTS ABOVE MINIMUM STANDARD IN NUMERACY BY STATE/TERRITORY

Source: NAPLAN National Reports, 2008-12, <http://www.nap.edu.au/results-and-reports/national-reports.html>.



## 5. The impact of SEAM on educational outcomes: Regression analysis

To further characterize SEAM's impact on participation and learning outcomes among the Indigenous population of the Northern Territory, we apply regression analysis to our data, using a difference-in-differences approach to estimate average annual effects of SEAM on participation rates and on the percentage of students above minimum standard. We assume that the entire Indigenous population of the Northern Territory was untreated in 2008, before implementation of SEAM; then fully treated in 2009 by the credible threat of having welfare payments withheld from parents who did not send their children to school; and then partially or ineffectively treated in subsequent years as the threat lost its credibility.<sup>15</sup> The Indigenous populations of other states and territories are taken to be untreated in all years and grade levels, and both knowledge domains.

We estimate each of our two equations over all eight states and territories in Australia, pooling all years and grade levels, and in both knowledge domains, thus taking Australia's other seven states and territories as our control group. As we showed in Section 3, the Indigenous population of the Northern Territory is different from that in other states and territories in other respects as well, not only in not being subject to SEAM. To test the robustness of our results to the choice of control group we first apply the synthetic control method (Abadie and Gardeazabal, 2003; Abadie, Diamond and Hainmueller, 2010), which automatically constructs an artificial control from the other states and territories by weighting them based on pre-treatment covariates.<sup>16</sup> Then we use placebo tests on all states and territories to construct a non-parametric test of the robustness of our results.

### 5.1 The basic difference-in-differences specification

For our basic difference-in-differences specification we pool the data over five years (2008-2012), four grade levels, two knowledge domains, and all eight states and territories, to estimate the following equation:

$$(3) \quad Y_{idgt} = \alpha + \beta_r I_r + \sum_{g=3,5,7} \gamma_g I_g + \sum_{t=2009}^{2012} \delta_t I_t + \eta I_{NT} + \sum_{t=2009}^{2012} \kappa_t I_t I_{NT} + v_{idgt}$$

<sup>15</sup> If the assumption that all Indigenous parents of truant Children in the NT were treated—i.e., all believed that their welfare payments would be reduced if they did not send their children to school—is an overstatement, then our estimated effects are biased downward.

<sup>16</sup> Computations are done in R with the “synth” package (Abadie, Diamond Hainmueller, 2011).

where  $Y_{idgt}$  is the outcome variable—the participation rate or share of the cohort above minimum standard—for the Indigenous population in state/territory  $i$ , in knowledge domain  $d$  (numeracy or reading) and grade  $g$  (3, 5, 7 or 9), in year  $t$  (between 2008 and 2012). Here,  $I_r$  is an indicator for the reading domain (numeracy is omitted) and  $\beta_r$  is a fixed effect for reading;  $I_g$  is an indicator for grade level (grade 9 is omitted) and  $\gamma_g$  is a grade level effect;  $I_t$  is an indicator for year (2008 is omitted) and  $\delta_t$  is a year effect;  $I_{NT}$  is an indicator for the Northern Territory and  $\eta$  is the Northern Territory fixed effect;  $\kappa_t$  is the difference-in-difference effect for year  $t$ ; and  $v_{idgt}$  is an i.i.d. error term. Our interest focuses on  $\kappa_t$  as it varies over time: it averages out the difference in the difference in the outcome between the base year and year  $t$  between the Northern Territory Indigenous population and the Indigenous populations in other states and territories, over all grade levels, knowledge domains and states and territories. We expect a large significant positive value in 2009, compared to 2008, the effect of the credible threat; and a subsequent decline, compared to 2009, when the threat proves hollow.<sup>17</sup> The results of the two regressions—for participation and share above minimum standard—are presented in Table 5.

TABLE 5—INDIGENOUS OUTCOMES, POOLED DIFFERENCE-IN-DIFFERENCE REGRESSIONS

	<i>Participation</i>		<i>Above minimum standard</i>	
	Coefficient	Standard error	Coefficient	Standard error
Intercept	0.791	0.009	0.644	0.016
Northern Territory (NT)	-0.211	0.018	-0.452	0.034
Grade 3	0.123	0.007	0.146	0.014
Grade 5	0.132	0.008	0.101	0.014
Grade 7	0.101	0.007	0.110	0.014
t=2009	-0.017	0.009	-0.022	0.016
t=2010	-0.017	0.009	-0.014	0.016
t=2011	-0.026	0.009	-0.011	0.016
t=2012	-0.026	0.009	-0.026	0.017
Reading	0.007	0.005	-0.022	0.010
NT in 2009	0.196	0.025	0.099	0.048
NT in 2010	0.101	0.024	0.054	0.046
NT in 2011	0.115	0.024	0.077	0.048
NT in 2012	0.085	0.025	0.042	0.047

*Note:* Linear models fit by robust regression. Standard errors come from bootstrapping the regression models 1999 times by fixed-x resampling. Estimates are approximately the same when the models are fit by OLS.

Considering first the participation equation, in the left panel of Table 5, we find that the average participation rate of the Indigenous population in the Northern Territory in 2008 is a highly

<sup>17</sup> The key assumption here is that treatment is independent of the stochastic component.

significant 21.1 percentage points lower than the average rate for the Indigenous populations of other states and territories in grade 9, and 8-11 percentage points lower in the lower grades; there was no significant difference in participation rates between numeracy and reading; and participation rates in 2008 were generally higher than in subsequent years by 1.7-2.6 percentage points.

Our main quantities of interest in these equations are the difference in difference coefficients,  $\kappa_t$ , estimating the time variation of Indigenous participation in the Northern Territory compared to the time variation of Indigenous outcomes in other states and territories. They appear in the shaded bottom four rows of Table 5. We find a highly significant effect of 19.6 percentage points in 2009, which then falls off by nearly half in 2010, rises slightly in 2011, and falls again in 2012, to a level 8.5 percentage points above 2008 participation rates. Of these changes, the difference between 2009 and subsequent years is statistically significant as are the differences between each year and 2008 (all for  $p$ -values of 0.001); however our estimates for 2010, 2011 and 2012 are not statistically different from each other.

Turning now to the share of the Indigenous cohort above minimum standard, we find that in the base year, 2008, in grade 9 numeracy, the share above minimum standard in the Northern Territory is an alarming (and highly significant) 45 percentage points lower than the average share among the Indigenous populations in other states and territories. This difference is smaller in earlier grades, between 31 and 35 percentage points, but still extremely large; and larger in reading by a marginally significant 2.2 percentage points. Shares above minimum standard in 2008 were again higher by 1.1-2.6 percentage points compared to subsequent years. Regarding our difference-in-differences coefficient—the difference over time in the difference between the share of Indigenous students above minimum standard in the Northern Territory and their share among the Indigenous populations of other states and territories—we find an effect of 9.9 percentage points in 2009 (significant for a  $p$ -value of 0.02). Subsequent values remain positive, between 4.2 and 7.7 percentage points above the 2008 share, but no other differences are statistically significant.

## 5.2 *Synthetic control estimates*

The appropriateness of the difference in differences approach rests on the assumption that absent any treatment the potential change over time in the outcome variable, after controlling for observables, should be the same for the control and treated groups. This assumption gains plausibility the more similar are the treatment and control groups prior to treatment. Our basic regression used the Indigenous population in all other states and territories as our control group,

though some are very different from the Northern Territory.<sup>18</sup> A synthetic control is a weighted average of potential control units that best approximates the treated unit prior to treatment on relevant observable covariates, thus achieving greater similarity between treatment and control units (Abadie, Diamond and Hainmueller, 2010). We used an automated method to construct our synthetic control for both regressions, based on the following pre-treatment covariates (all variables refer to 2008 values):

- (i) Percentage of students participating in NAPLAN
- (ii) Percentage of participating students who scored above minimum standard
- (iii) Percentage of students in the cohort above minimum standard
- (iv) Average achievement in NAPLAN test

We obtained, in this application, that the synthetic control for the Northern Territory is simply Western Australia.<sup>19</sup> We therefore re-estimate the regressions in Table 5 over just two geographic units: the Northern Territory and the state of Western Australia, its synthetic control. The results are presented in Table 6.

TABLE 6—REGRESSION ESTIMATES WITH WESTERN AUSTRALIA AS A SYNTHETIC CONTROL

	<i>Participation</i>		<i>Above minimum standard</i>	
	Coefficient	Standard error	Coefficient	Standard error
Intercept	0.711	0.006	0.494	0.015
Northern Territory (NT)	-0.133	0.007	-0.255	0.018
Grade 3	0.126	0.004	0.112	0.011
Grade 5	0.137	0.004	0.039	0.011
Grade 7	0.113	0.004	0.103	0.011
t=2009	0.001	0.007	0.015	0.018
t=2010	0.019	0.007	0.020	0.018
t=2011	-0.006	0.007	-0.034	0.018
t=2012	0.001	0.007	0.002	0.018
Reading	0.011	0.003	0.056	0.008
NT in 2009	0.163	0.010	0.054	0.025
NT in 2010	0.056	0.010	0.017	0.025
NT in 2011	0.090	0.010	0.027	0.025
NT in 2012	0.055	0.010	0.012	0.025

*Note:* Linear models fit by robust regression. Standard errors come from bootstrapping the regression models 1999 times by fixed-x resampling. Estimates are approximately the same when the models are fit by OLS.

<sup>18</sup> As an extreme example, where the share above minimum standard for Indigenous students in the Northern Territory is rarely above 40%, in the Australian Capital Territory, 80% of students score above minimum standard in many domain and grade level combinations.

<sup>19</sup> The program assigned a weight of 1 to Western Australia and a weight of 0 to all other states.

The effects we find here are similar but somewhat smaller. The rise in participation rates between 2008 and 2009 is here 16.3 percentage points, still large but smaller than the estimate of 19.6 using all states as counterfactuals; the subsequent decline between 2009 to 2010 is slightly larger but still similar, 10.7 percentage points compared to 9.6; and the remaining difference in 2012, over the 2008 base-year value is again smaller, 5.5 percentage points compared to 8.5. Making the same comparison for the share above minimum standard we find that the estimates using WA as the synthetic control yield smaller, though not statistically different, estimated coefficients. The difference in results between the two methods is the result of two effects. The first is, the greater similarity of the Indigenous population of the Northern Territory to the Indigenous population of Western Australia, which should reduce a possible bias arising from differences between the Indigenous population of the Northern Territory and less similar Indigenous populations in states and territories other than Western Australia. The second is the greater random variation associated with outcomes in a single state, which are averaged out when the full set of states is included in the regression. We cannot say how much of the difference should be attributed to each effect and treat the fairly narrow range between the two sets of estimates as setting upper and lower bounds on the actual treatment effect.

### 5.3 Placebo tests

To further test the robustness of our results, we construct a placebo test for the initial treatment effect. Placebo tests are widely used to show that an effect that has been identified is not spurious (DiNardo and Pischke 1997; Angrist and Krueger 1999; Abadie and Gardeazabal, 2003). For each state and territory we construct a synthetic control and calculate the difference in difference in outcome variables between 2008 and 2009 within each grade-domain:

$$(4) \quad Z_{idg} = (Y_{idg,2009} - Y_{idg,2008}) - (Y_{c(i)dg,2009} - Y_{c(i)dg,2008})$$

where  $Y_{idgt}$  is as before the outcome for state or territory  $i$  in knowledge domain  $d$  and grade  $g$ ; and  $c(i)$  is the synthetic control for state or territory  $i$ . We then compare the treatment effect across all states and territories. The results for participation rates in NAPLAN are presented in Table 7, and for the share achieving minimum standard in Table 8.

Considering first the treatment effect on participation rates, in Table 7, we find that for both domains and across all grade levels, the highest values are in the Northern Territory with the exception of year 9 numeracy, where Queensland and Tasmania show stronger effects. The

probability of achieving a result "as good" as this from random permutations,<sup>20</sup>  $(1/8)^7(3/8)$ , is less than  $10^{-6}$ . Averaging the treatment effects on participation for the Northern Territory across all grade levels and both knowledge domains we obtain a value of 17.6, slightly higher than the value obtained from the regression with the synthetic control.

TABLE 7— PLACEBO TEST FOR THE TREATMENT EFFECT ON PARTICIPATION RATES

<i>State/Territory</i>	Numeracy				Reading			
	Year 3	Year 5	Year 7	Year 9	Year 3	Year 5	Year 7	Year 9
Aust. Capital Territory	4.34	-0.22	-9.70	4.38	4.72	-3.13	-1.50	5.70
New South Wales	3.90	3.58	4.62	4.35	7.33	3.77	4.89	5.49
Queensland	4.02	3.61	4.93	12.22	1.98	6.23	6.06	12.52
South Australia	-14.30	-7.70	-5.31	-17.80	-12.97	-7.35	-7.40	-18.00
Tasmania	11.46	5.63	-4.23	8.21	12.57	6.99	1.00	6.89
Victoria	1.24	-0.22	6.18	-1.31	0.13	0.92	1.72	-3.11
Western Australia	-5.00	2.70	8.68	-4.10	-3.10	2.70	0.05	-3.25
Northern Territory	15.10	15.30	30.50	14.10	16.30	17.20	25.70	6.80

*Notes:* This table lists estimates for each state/territory using the synthetic control method. Each jurisdiction's synthetic control is a weighted average of other jurisdictions; for the Northern Territory, a weight of 1 is assigned to Western Australia. The pre-SEAM covariates for each permutation are the participation rate in 2008, the proportion above minimum standard, the average test score and the pass rate in all years. Computations were done using the synth package in R (Abadie, Diamond and Hainmueller 2011).

Table 8 presents treatment effects on the share achieving minimum standard. The result again indicates the presence of a significant treatment effect for the Northern Territory. The results are not as strong but still highly significant. The Northern Territory remains the only state or territory with a positive effect for all grade levels and both knowledge domains. Its effect is largest in grades 5 and 7 numeracy and grade 7 reading; it has the second largest effect in grade 9 numeracy and grades 3 and 5 reading; and the third largest effect in grade 3 numeracy and grade 9 reading. The probability of achieving a results as good as this from random permutations,  $(1/8)^3 (2/8)^3 (3/8)^2$ , is less than  $10^{-5}$ . Averaging the treatment effects on share achieving minimum standard for the Northern Territory across all grade levels and both knowledge domains we obtain a value of 5.8, again slightly higher than the value obtained from the synthetic control regression.

<sup>20</sup> The probability of ranking first in a random drawing from eight states/territories is  $1/8$ ; the probability of this happening seven times, assuming the draws are independent is  $(1/8)^7$ ; and the probability of ranking in the first three places is  $3/8$ .

TABLE 8—PLACEBO TEST FOR THE TREATMENT EFFECT ON THE SHARE ACHIEVING MINIMUM STANDARD

<i>State/Territory</i>	Numeracy				Reading			
	Year 3	Year 5	Year 3	Year 5	Year 3	Year 5	Year 3	Year 5
Aust. Capital Territory	2.66	4.38	4.68	2.65	2.14	4.06	6.03	5.75
New South Wales	10.76	1.27	5.67	9.30	12.17	3.62	2.12	-1.63
Queensland	-	-7.6	-4.88	-	-	-4.41	-3.85	-8.41
South Australia	-3.20	2.80	-8.60	-4.80	-1.10	-2.60	-1.50	-3.90
Tasmania	3.90	5.75	5.05	-0.24	-1.13	9.01	4.42	1.51
Victoria	-3.20	3.00	6.80	-3.10	-0.90	3.50	7.00	-6.80
Western Australia	4.10	6.80	6.80	4.30	5.50	4.40	10.10	4.60
Northern Territory	4.75	0.59	-9.28	4.08	3.74	-6.77	-4.37	7.05

*Notes:* This table lists estimates for each state/territory using the synthetic control method. Each jurisdiction's synthetic control is a weighted average of other jurisdictions; for the Northern Territory, a weight of 1 is assigned to Western Australia. The pre-SEAM covariates for each permutation are the participation rate in 2008, the proportion above minimum standard, the average test score and the pass rate in all years. Computations were done using the synth package in R (Abadie, Diamond and Hainmueller 2011).

Table 9 presents the different estimates obtained for the various treatment effects from the three methods used: difference-in-differences regressions using all states/territories as controls (columns 1 and 4); difference-in-differences regressions using only Western Australia as the counterfactual (columns 2 and 5); and the average effect obtained from a disaggregated calculation of difference-in-differences effects between the Northern Territory and Western Australia, its synthetic control (columns 3 and 6).

TABLE 9—COMPARISON OF ESTIMATES, %

	Participation			Above minimum standard		
	(1)	(2)	(3)	(4)	(5)	(6)
Increase from 2008 to 2009	19.6	16.3	17.6	9.9	5.4	5.8
Decline from 2009 to 2010	9.5	10.7		4.5	3.7	
Increase from 2008 to 2012	8.5	5.5		4.2	1.2	

*Notes:* The estimates in columns 3 and 6 are the average of all Northern Territory synthetic control estimates from row 8 in Tables 7 and 8 respectively.

While these estimates vary across the different methods they present a similar pattern. The initial effect of SEAM, when the threat was perceived to be credible, was very large: participation rates rose in one year by 16-20 percentage points above an average base rate of 68%, then declined in one

year by about 10 percentage points, once it became clear that the threat was not carried out; and reached a participation rate 5 to 8 percentage points above pre-SEAM levels in 2012, the last year in our study.

The initial effect of SEAM on the share of the cohort achieving minimum standard in the first year of implementation, when the threat was perceived to be credible, was also large: an increase of between 5 and 10 percentage points above an average base rate of 32%. This was followed by a large decline the following year of between 3 to 5 percentage points, and share levels in 2012 that were 1 to 4 percentage points above pre-SEAM levels.

## 6. Conclusion

Australia's School Enrolment and Attendance through Welfare Reform Measure (SEAM), implemented in 2009 to raise school attendance rates among Indigenous children in the Northern Territory, and implemented against the backdrop of the Northern Territory Emergency Response (NTER), provides a unique opportunity to study the effect of a *credible* threat to link welfare payments to school attendance. The strong police and military presence that was part of the NTER, the temporary suspension of the Racial Discrimination Act, as well as the troubled history of race relations in Australia, all contributed to creating a climate in which the Indigenous community of the Northern Territory came to believe, mistakenly, that truancy would be universally punished by an immediate reduction in welfare payments. This led to a strong positive response, initially, dramatically increasing NAPLAN participation rates. However, as the harsh measures threatened by SEAM were not carried out in practice, and this became widely known, the threat evaporated and much, though not all of the gains dissipated.

In this paper we estimated the strength of this response and its variation over time, using participation rates and test scores drawn from Australia's National Assessment Program—Language Arts and Numeracy (NAPLAN). Specifically, we estimated difference-in-differences regressions that compared the change in participation rates and test scores in reading and numeracy, in grades 3, 5, 7 and 9, between 2008, the year before SEAM was implemented, and each year until 2012, between the Indigenous population of the Northern Territory and the Indigenous populations of Australia's other states and territories. We found that in 2009, the first year in which SEAM was implemented, test participation increased dramatically, on average between 16 and 20 percentage points above a pre-SEAM rate of 68%, beyond the average change in Australia's other Indigenous populations. This rise in participation rates did not lower test means appreciably, suggesting that the academic ability



of those induced to sit the test by SEAM was similar, on average, to that of students who would have participated in NAPLAN absent SEAM. Consequently, the share of each cohort achieving minimum standard in each subject in that year increased substantially in 2009, by between five and ten percentage points over a pre-SEAM base rate of 32%, with no similar rise in other Indigenous populations. However, as the threat of withholding welfare payments was not actually carried out except in a handful of cases, and this was observed and became widely known, participation rates fell off substantially in the following year, and subsequent years saw most but not all of the gains evaporating. Participation rates in 2012, the last year in our study, remained significantly above pre-SEAM participation rates but nearly all the gains in the share of the cohort achieving minimum standard had disappeared by then.

These findings demonstrate that a *credible* threat to link welfare payments to school attendance can be highly effective, at least in the short run. At the same time they also demonstrate the difficulty of following through on such threats, even in the unique circumstances of SEAM, which leant them their initial credibility. Once the threat proved hollow, most of the initial gains were reversed, indicating that many of the parents coerced into sending their children to school by SEAM did not come to appreciate the value of schooling for their children through this experience. This suggests that even credible efforts to enforce compulsory schooling by linking welfare payments to school attendance, or other punitive action, will not be fully effective in the longer term unless they are accompanied by measures that increase parents' and children's appreciation of the value of schooling.

## References

- Abadie, Alberto, Alexis Diamond and Jens Hainmueller, 2011. "Synth: An R Package for Synthetic Control Methods in Comparative Case Studies", *Journal of Statistical Software*, 42(12):1-17.
- Abadie, Alberto, Alexis Diamond and Jens Hainmueller, 2010. "Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program," *Journal of the American Statistical Association* 105:493–505.
- Abadie, Alberto and Javier Gardeazabal, 2003. "The Economic Costs of Conflict: A Case Study of the Basque Country," *American Economic Review* 93:112–132.
- Agrist, Joshua D. and Alan B. Krueger, 1999. "Empirical Strategies in Labor Economics." In *Handbook of Labor Economics*, Vol. 3, eds. A. Ashenfelter and D. Card, Amsterdam: Elsevier.
- Altman, Jon, Geoff Buchanan and Nicholas Biddle, 2006. "Measuring the 'Real' Indigenous Economy in Remote Australia Using NATSISS 2002," *Australian Journal of Labour Economics* 9:17–31.
- Altman, Jon, Nicholas Biddle and Boyd Hunter, 2008. "How realistic are the prospects for 'closing the gaps' in socioeconomic outcomes for Indigenous Australians?," Working Paper 287/2008 Centre for Aboriginal Economic Policy Research, Australia National University, Canberra.  
<http://caepr.anu.edu.au/Publications/DP/2008DP287.php>
- Altman, Jon and Susie Russell. 2012. "Too much 'Dreaming': Evaluations of the Northern Territory National Emergency Response Intervention 2007-2012," *Evidence Base* 3.
- SCRGSP (Steering Committee for the Review of Government Service Provision) 2011, *Overcoming Indigenous Disadvantage: Key Indicators 2011*, Productivity Commission, Canberra.
- Broome, Richard. 2010. *Aboriginal Australians: A history since 1788*. 4th ed. Sydney: Allen and Unwin.
- Campbell, David and Joan Wright, 2005. "Rethinking Welfare School-Attendance Policies," *Social Service Review* 79:2-28.
- Cook, Philip J., Kenneth Dodge, George Farkas, Roland G. Fryer, Jonathan Guryan, Jens Ludwig, Susan Mayer, Harold Pollack, and Laurence Steinberg. 2014. "The (Surprising) Efficacy of Academic and Behavioral Intervention with Disadvantaged Youth: Results from a Randomized Experiment in Chicago." Working Paper 19862, National Bureau of Economic Research, Cambridge, MA. <http://www.nber.org/papers/w19862.pdf>.
- DEEWR. 2011. "Improving School Enrolment and Attendance through Welfare Reform Measure (SEAM): Evaluation Report for the Northern Territory in 2009," Social Policy and Economic

Strategy Group, Department of Education, Employment and Workplace Relations Canberra, Australia.

- DiNardo, J. E. and J.S. Pischke, 1997. "The Returns to Computer Use Revisited: Have Pencils Changed the Wage Structure Too?" *Quarterly Journal of Economics* 112:291–303.
- Hunter, Boyd and Matthew Gray. 2012. "Indigenous Labour Supply following a Period of Strong Economic Growth.", *Australian Journal of Labour Economics* 15(2): 141-159.
- Levitt, Steven, John List, Susanne Neckerman and Sally Sadoff. 2012. "The Behavioralist Goes to School: Leveraging Behavioral Economics to Improve Educational Performance." Working Paper 18165, National Bureau of Economic Research, Cambridge, MA.
- Rawlings, Laura and Gloria Rubio. 2005. "Evaluating the Impact of Conditional Cash Transfer Programs," *The World Bank Research Observer* 20(1):29–55.
- Stephens, Benjamin J. 2010. The "Determinants of Labour Force Status among Indigenous Australians," *Australian Journal of Labour Economics*, 13(3): 287-312.
- Wild, Rex and Patricia Anderson. 2007. *Ampe Akelyernemane Meke Mekarle "Little Children are Sacred"*. Report of the Northern Territory Board of Inquiry into the Protection of Aboriginal Children from Sexual Abuse. Northern Territory Government, Darwin.

Appendix

TABLE A1: GRADE 3 NUMERACY

<i>State/Territory</i>	% Participating in NAPLAN					% Above minimum standard				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Northern Territory	0.72	0.86	0.78	0.79	0.75	0.38	0.37	0.37	0.48	0.31
Western Australia	0.84	0.83	0.86	0.84	0.83	0.64	0.58	0.64	0.68	0.54
Queensland	0.94	0.92	0.93	0.92	0.90	0.73	0.70	0.77	0.81	0.69
New South Wales	0.92	0.94	0.94	0.93	0.93	0.83	0.81	0.81	0.86	0.80
Victoria	0.89	0.89	0.85	0.87	0.88	0.86	0.85	0.78	0.82	0.81
South Australia	0.97	0.83	0.82	0.81	0.85	0.81	0.61	0.65	0.68	0.61
Tasmania	0.95	0.96	0.96	0.94	0.95	0.91	0.87	0.86	0.87	0.83
Australian Capital Territory	0.88	0.92	0.92	0.86	0.87	0.79	0.81	0.85	0.80	0.78

TABLE A2: GRADE 3 READING

<i>State/Territory</i>	% Participating in NAPLAN					% Above minimum standard				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Northern Territory	0.71	0.89	0.79	0.81	0.78	0.22	0.37	0.35	0.33	0.32
Western Australia	0.85	0.86	0.87	0.85	0.85	0.49	0.58	0.60	0.61	0.56
Queensland	0.95	0.94	0.93	0.93	0.92	0.65	0.75	0.76	0.76	0.74
New South Wales	0.94	0.94	0.95	0.94	0.94	0.79	0.83	0.84	0.82	0.81
Victoria	0.90	0.90	0.85	0.88	0.89	0.82	0.83	0.79	0.82	0.81
South Australia	0.96	0.82	0.83	0.81	0.84	0.73	0.65	0.65	0.62	0.66
Tasmania	0.97	0.96	0.96	0.95	0.96	0.86	0.86	0.86	0.83	0.83
Australian Capital Territory	0.90	0.94	0.92	0.87	0.86	0.77	0.82	0.84	0.79	0.78

TABLE A3: GRADE 5 NUMERACY

<i>State/Territory</i>	% Participating in NAPLAN					% Above minimum standard				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Northern Territory	0.72	0.90	0.79	0.80	0.76	0.28	0.42	0.32	0.38	0.28
Western Australia	0.84	0.86	0.86	0.84	0.85	0.52	0.60	0.55	0.57	0.53
Queensland	0.94	0.93	0.93	0.92	0.89	0.67	0.71	0.70	0.73	0.65
New South Wales	0.92	0.94	0.93	0.94	0.93	0.73	0.79	0.78	0.81	0.78
Victoria	0.89	0.89	0.88	0.89	0.88	0.77	0.82	0.81	0.83	0.79
South Australia	0.97	0.87	0.86	0.84	0.87	0.71	0.66	0.61	0.65	0.61
Tasmania	0.95	0.94	0.96	0.95	0.96	0.85	0.82	0.83	0.86	0.83
Australian Capital Territory	0.92	0.90	0.90	0.93	0.89	0.80	0.79	0.76	0.85	0.78

TABLE A4: GRADE 5 READING

<i>State/Territory</i>	% Participating in NAPLAN					% Above minimum standard				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Northern Territory	0.71	0.92	0.81	0.81	0.80	0.19	0.30	0.27	0.25	0.23
Western Australia	0.84	0.88	0.87	0.86	0.86	0.44	0.51	0.48	0.48	0.48
Queensland	0.95	0.94	0.94	0.93	0.90	0.62	0.64	0.65	0.65	0.62
New South Wales	0.93	0.95	0.94	0.94	0.94	0.73	0.75	0.76	0.76	0.75
Victoria	0.90	0.91	0.88	0.90	0.89	0.78	0.83	0.79	0.81	0.79
South Australia	0.97	0.87	0.87	0.85	0.88	0.64	0.61	0.59	0.60	0.60
Tasmania	0.97	0.95	0.96	0.97	0.96	0.83	0.76	0.81	0.82	0.79
Australian Capital Territory	0.91	0.89	0.89	0.93	0.89	0.78	0.74	0.72	0.85	0.77

TABLE A5: GRADE 7 NUMERACY

<i>State/Territory</i>	% Participating in NAPLAN					% Above minimum standard				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Northern Territory	0.65	0.87	0.81	0.75	0.71	0.33	0.39	0.36	0.34	0.31
Western Australia	0.84	0.84	0.85	0.82	0.84	0.63	0.62	0.63	0.61	0.61
Queensland	0.94	0.93	0.93	0.92	0.90	0.79	0.75	0.78	0.76	0.73
New South Wales	0.88	0.90	0.89	0.90	0.88	0.75	0.73	0.74	0.74	0.70
Victoria	0.87	0.86	0.83	0.85	0.85	0.79	0.75	0.75	0.76	0.76
South Australia	0.94	0.87	0.84	0.87	0.83	0.75	0.67	0.68	0.69	0.64
Tasmania	0.94	0.88	0.93	0.89	0.91	0.87	0.74	0.83	0.76	0.81
Australian Capital Territory	0.83	0.74	0.87	0.86	0.83	0.76	0.63	0.78	0.72	0.71

TABLE A6: GRADE 7 READING

<i>State/Territory</i>	% Participating in NAPLAN					% Above minimum standard				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Northern Territory	0.63	0.87	0.77	0.76	0.74	0.21	0.32	0.33	0.34	0.30
Western Australia	0.86	0.85	0.85	0.83	0.85	0.56	0.57	0.61	0.62	0.60
Queensland	0.95	0.94	0.94	0.93	0.92	0.73	0.71	0.77	0.76	0.73
New South Wales	0.89	0.92	0.91	0.91	0.90	0.74	0.76	0.77	0.77	0.76
Victoria	0.85	0.85	0.84	0.88	0.86	0.75	0.74	0.77	0.80	0.79
South Australia	0.96	0.87	0.86	0.88	0.86	0.70	0.65	0.70	0.71	0.69
Tasmania	0.93	0.89	0.94	0.89	0.93	0.83	0.74	0.83	0.78	0.84
Australian Capital Territory	0.81	0.79	0.85	0.85	0.84	0.77	0.69	0.78	0.76	0.73

TABLE A7: GRADE 9 NUMERACY

<i>State/Territory</i>	% Participating in NAPLAN					% Above minimum standard				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Northern Territory	0.61	0.75	0.64	0.68	0.65	0.29	0.35	0.25	0.30	0.31
Western Australia	0.72	0.71	0.74	0.69	0.70	0.48	0.50	0.48	0.48	0.49
Queensland	0.86	0.85	0.86	0.83	0.81	0.65	0.67	0.66	0.64	0.65
New South Wales	0.79	0.82	0.81	0.80	0.77	0.64	0.67	0.62	0.61	0.62
Victoria	0.79	0.77	0.73	0.69	0.75	0.67	0.68	0.62	0.58	0.66
South Australia	0.89	0.70	0.65	0.73	0.68	0.65	0.55	0.45	0.52	0.51
Tasmania	0.84	0.83	0.87	0.81	0.84	0.75	0.71	0.74	0.66	0.73
Australian Capital Territory	0.73	0.77	0.77	0.73	0.78	0.61	0.66	0.67	0.62	0.69

TABLE A8: GRADE 9 READING

<i>State/Territory</i>	% Participating in NAPLAN					% Above minimum standard				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Northern Territory	0.62	0.75	0.66	0.69	0.66	0.24	0.25	0.23	0.27	0.21
Western Australia	0.71	0.72	0.74	0.70	0.71	0.46	0.42	0.42	0.45	0.42
Queensland	0.87	0.86	0.86	0.84	0.81	0.63	0.57	0.59	0.63	0.59
New South Wales	0.80	0.84	0.82	0.81	0.79	0.67	0.67	0.60	0.65	0.61
Victoria	0.78	0.75	0.71	0.71	0.77	0.67	0.63	0.57	0.61	0.66
South Australia	0.90	0.71	0.68	0.71	0.69	0.60	0.49	0.41	0.50	0.49
Tasmania	0.82	0.83	0.85	0.81	0.83	0.75	0.67	0.69	0.68	0.68
Australian Capital Territory	0.69	0.76	0.77	0.69	0.80	0.59	0.62	0.67	0.64	0.67