

Enforcing Compulsory Schooling through Credible Coercion: Lessons from Australia's Northern Territory Intervention*

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Australia's Northern Territory Emergency Response and subsequent School Enrolment and Attendance Measure (SEAM) credibly threatened to remove welfare benefits from Indigenous families if their children failed to attend school regularly. A difference-in-difference analysis of participation rates in the National Assessment Program – Literacy and Numeracy shows a substantial increase in participation rates the year after SEAM was implemented. However, administrators rarely carried out the threatened sanctions, and these initial gains largely dissipated in subsequent years. This unique episode illustrates the limited scope for promoting Indigenous school participation through conditional cash penalties.

I Introduction

Regular school attendance is a key element in breaking the intergenerational chain of poverty, yet children growing up in deprived circumstances are those most likely to be absent from school. Some developing countries have

successfully addressed this issue by offering conditional cash transfers to low-income parents, as an inducement to send their children to school regularly (Rawlings & Rubio, 2005), but there is little scope for such interventions in democracies with compulsory schooling laws. Offering parents money for complying with the law, though potentially effective, is inherently unpopular when funded from tax revenues—and too expensive to fund routinely from private sources.¹ This has led state and local jurisdictions in the United States to experiment with conditional cash penalties: threatening families on welfare that they will lose benefits if their children do not attend school regularly.

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¹ Levitt *et al.* (2012) and Cook *et al.* (2014) report on successful field experiments with conditional cash transfers in Chicago, funded from non-government sources. The economics literature often assumes that financial incentives promote participation, but extensive research indicates that extrinsic incentives can reduce intrinsic motivation (Deci *et al.*, 2001; Bowles, 2016).

Withholding welfare payments from truly needy families in these circumstances is problematic on various levels, not least of which is the immediate harm it may cause the children it means to help, creating new obstacles that may further impede their regular school attendance. Moreover, it places all the responsibility for poor attendance on the family, ignoring the role of the education system and the broader environment as contributing factors. Architects of these policies may assume that the threat of withholding payments will be sufficient to deter truancy, and therefore need not be carried out, imagining an equilibrium in which everyone attends school regularly and none lose their benefits. However, experience shows that truant families are sometimes unaware of the threat, and for some the price of complying is too high, leaving welfare administrators with the difficult choice of following through on the threat and imposing yet greater difficulties on a struggling family, or resisting following through and losing credibility. Campbell and Wright (2005) note that by 1999, 40 US states had enacted policies that conditioned welfare cash assistance on regular school attendance, though few were reliably evaluated. Summarising rigorous evaluations of eight of these programs, they conclude that only policies that brought additional resources to bear on the problems these families faced, were successful in raising school attendance significantly.²

The unique experience of Australia's Northern Territory Emergency Response (NTER) and subsequent Improving School Enrolment and Attendance through Welfare Reform Measure (SEAM) sheds further light on this issue. The NTER, a broad intervention enacted in July 2007 and explicitly directed at the territory's Indigenous population, was a federal response to a report commissioned by the Chief Minister of the Northern Territory alleging child abuse in Aboriginal communities, and designating it 'an issue

² Four of these programs targeted pregnant or parenting teens, combined sanctions with expanded case management and support services, and showed significant if modest results. Four other programs relied only on sanctions or the threat of sanctions and had a negligible effect on attendance. However, at least in one case this was due to targeted families attending school regularly before the program's inception; and in another case, Wisconsin's Learnfare program, subsequent re-analysis of the data by Dee (2011) found significant, if modest effects.

of urgent national significance' (Wild & Anderson, 2007). Among its key elements were a military presence ('Operation Outreach') and 'income management', which quarantined a large share of welfare payments into a special account for the purchase of essential household items (Broome, 2010; chapter 14; Mendes *et al.*, 2014).³

Income management under the NTER was meant to address a range of deviant behaviours (child abuse, family violence, mismanagement of financial resources, alcoholism, and poor school attendance) that were perceived to be widespread among Indigenous communities in the Northern Territory. It targeted all Indigenous families in designated communities, almost all of them 'very remote', and other Indigenous families identified by the welfare authorities. SEAM, initiated in 2009 against the backdrop of the NTER, drew its credibility from the heightened anxiety and uncertainty that the NTER generated.⁴ SEAM focused specifically on schooling, threatening to withhold welfare payments from Indigenous parents of truant children if their children failed to meet school attendance requirements. While formally applying to a small number of communities, government reports note that it was widely, if incorrectly, perceived as targeting all Indigenous families in the Northern Territory.

We estimate the impact of SEAM, within the context of the NTER, indirectly through its effect on student participation in Australia's National Assessment Program – Literacy and Numeracy (NAPLAN). Initiated in 2008, a year before SEAM, NAPLAN annually administers standardised tests in numeracy, reading, spelling, grammar and writing to all Australian students in grades 3, 5, 7 and 9. We apply a difference-in-difference analysis to participation rates of Indigenous students in the Northern Territory in NAPLAN numeracy and reading tests, comparing their

³ Its explicit targeting of Indigenous families required temporary suspension of Australia's Racial Discrimination Act.

⁴ This was reinforced by the living memory of yet severer measures directed by past Australian governments at Aboriginal families, notably the forced removal of Indigenous children from their families by government agencies, which continued until the mid-1970s. In February 2008, as the NTER was rolled out, Prime Minister Kevin Rudd issued a formal recognition and apology for what the Australian government called 'the stolen generations' (Australian Human Rights Commission, 1997).

variation over time to the variation of participation rates among Indigenous students in Australia's other states and territories. Specifically, we focus on the difference between 2008, the year before SEAM, and subsequent years to 2012.⁵

We find that in 2009, the first year in which SEAM was implemented, test participation increased dramatically among Indigenous children in the Northern Territory, rising by 16–20 percentage points compared to 2008 pre-SEAM levels, while no similar increase appeared among the Indigenous student population in Australia's other states and territories. Moreover, this sharp rise in participation rates did not lead to a decline in pass rates for the Indigenous students in the Northern Territory, suggesting that the observed increase in test participation indeed reflected a meaningful improvement in education outcomes.

We interpret these findings as demonstrating how the combined effect of the NTER and SEAM credibly threatened to link welfare payments to school attendance and substantially raised participation rates. This rests on the assumption that changes in Indigenous participation rates outside the Northern Territory are a good approximation for the (unobservable) counterfactual changes in the Northern Territory had there in fact been no such threat. In the absence of pre-2008 observations, we cannot rule out the possibility that the low 2008 levels we observe were in themselves a singular improvement over 2007 levels, achieved by the NTER without SEAM, which SEAM raised further. However, it seems unlikely that this increase in participation rates continued a yet earlier trend that preceded the NTER, as the NTER was initiated in response to a perceived crisis in childcare among Indigenous families in the Northern Territory, including high rates of truancy, which preceded the NTER by some years (Wild & Anderson, 2007; Broome, 2010; ch. 14).⁶

⁵ Our analysis relies on publicly available data aggregated by state/territory and Indigenous status. Individual NAPLAN data, which would allow a more detailed analysis, are not publicly available.

⁶ Attendance and enrolment rates for Indigenous students, aggregated by state and territory, are available for earlier years from other sources and show no rising trend, but do not correlate well with NAPLAN participation rates in years when they overlap. Cobb-Clark *et al.* (2017) analyse individual attendance and enrolment data in income-managed communities, in 2006–9, and also find no increases. We elaborate on this in Section IV.

The combination of SEAM and the NTER motivated many Indigenous parents in the Northern Territory to send their children to school in 2009. However, families that failed to meet school attendance requirements did not lose their welfare payments (Department of Education, Employment and Workplace Relations, 2011). This may have led some initially compliant families to revert to their earlier low levels of attendance: 2010 saw an erosion of about half the initial gains in attendance, with small subsequent fluctuations until 2012, the last year in our study.

We interpret the case of SEAM and the NTER as evidence that conditioning welfare benefits on school attendance may be initially effective but is difficult to sustain over time, even when initially induced by credible coercion. At most, it creates a 'window of opportunity' in which parents and children in truant families are exposed to school participation. However, for these policies to have a lasting effect and permanently increase attendance, the broader circumstances causing poor attendance need to be confronted. In the case of the Indigenous population of the Northern Territory, this may include directly addressing circumstances in the home that interfere with regular school attendance, modifying local schools to align them more closely with Indigenous culture and the hybrid Indigenous economy (Altman *et al.*, 2006), and improving employment prospects for those who graduate.

The rest of this paper is as follows. Section II provides background data on the Indigenous population in the Northern Territory. Section III describes the NTER and SEAM initiatives. Section IV presents descriptive statistics on the impact of SEAM on participation rates and changes in average performance in the Northern Territory. Section V presents the results of our regression analysis. Section VI concludes.

II Indigenous Australians in the Northern Territory

The number of Indigenous Australians in the Northern Territory, 56,000 in the 2011 census, is not the largest among Australia's states and territories, but their 27 per cent share of the total population in the territory is by far the largest. Indigenous Australians generally exhibit markedly weaker aggregate indicators of well-being than non-Indigenous Australians; and this gap is yet wider in the Northern Territory, where a large proportion of the Indigenous population live in very remote areas and maintain a separate,

traditional way of life outside the mainstream market economy.

Differences in life expectancy illustrate these gaps. In 2006, life expectancy at birth was 78.7 years for non-Indigenous Australian men; 75.7 years for non-Indigenous men in the Northern Territory; 67.2 years for all Indigenous Australian men; and 61.5 years for Indigenous men in the Northern Territory (Australian Bureau of Statistics, 2009, table 1.1).⁷ Differences in aggregate labour market outcomes are similarly arresting. In 2011, 76 per cent of non-Indigenous Australians participated in the labour force, with 72 per cent employed, while only 57 per cent of Indigenous Australians participated in the workforce with only 48 per cent employed. Among Indigenous Australians in the Northern Territory, these rates are even lower: 44 per cent participating in the workforce, and 38 per cent employed (Australian Bureau of Statistics, 2012, table 1). Moreover, even these low rates could not have been maintained without the support of the Community Development Employment Project (CDEP), a targeted work-for-welfare scheme (Hunter & Gray, 2012).⁸

Altman *et al.* (2006) describe Indigenous employment in Australia as divided among three sectors: the private or market sector, the public sector (predominantly 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. Though ignored by official statistics, employment in the customary or informal sector is especially large in very remote Indigenous communities, which account for a disproportionately large fraction of the Indigenous population of the Northern Territory. This increases the opportunity cost of conventional schooling while lowering its expected incremental returns.

Data drawn from the National Aboriginal and Torres Strait Islander Social Survey for 2008, presented in Table 1, illustrate the distinct cultural identity and personal circumstances of

⁷ The life expectancy of women is about 4 years more, with similar inter-group differences.

⁸ Altman *et al.* (2008) judge that 'labour force participation rates would take over a century to converge if the trends for the period 1971–2006 were to persist'. Similar gaps characterise health outcomes, family and community violence, incarceration and freedom from poverty (Stephens, 2010; Steering Committee for the Review of Government Service Provision, 2011).

Indigenous Australians living in the Northern Territory. Compared to other large Indigenous populations in Western Australia, Queensland, New South Wales and South Australia, Indigenous people in the Northern Territory have stronger ties to traditional Indigenous culture and ways of life, and to their tribal groups and natural families.

Differences in education achievement among Indigenous and non-Indigenous Australians and Indigenous Australians in the Northern Territory exhibit a similar pattern to those observed in life expectancy and the labour market. Thus, NAPLAN results for 2008 (its first year of operation and the year before SEAM was implemented) give the proportion of non-Indigenous Australian students in grade 7 achieving the national minimum in numeracy as 96.4 per cent. The corresponding proportion for all Indigenous Australians was 78.6 per cent; for Indigenous Australians in the Northern Territory, 50.2 per cent; and for Indigenous Australians in the Northern Territory in very remote locations, 34.9 per cent (NAPLAN, 2008–2012). Patterns for other grade levels are similar, and differences for reading are yet more pronounced.

III The Perception of SEAM within the Context of the NTER

The impact of SEAM on participation in schooling can only be understood against the backdrop of the controversial NTER that preceded it. SEAM was not officially a part of the NTER, but it was the operational context of the NTER that lent SEAM much of its initial credibility and effectiveness. The conservative Liberal–National Coalition government led by John Howard implemented the NTER in 2007, during the lead-up to a federal election. It came in response to allegations of widespread child neglect and sexual abuse in Indigenous communities, set out in the report of a special Board of Inquiry entitled *Little Children are Sacred* (Wild & Anderson, 2007). The initial action involved an increased presence of police and military units in the Northern Territory, a show of force that would not have been constitutionally possible in an Australian state.⁹ In addition, it implemented a set of racially targeted measures, which required

⁹ As distinct from a territory. The Australian Defence Force (ADF) began 'Operation Outreach' on 27 June 2007, deploying over 600 ADF personnel, (http://www.defence.gov.au/FOI/Docs/Disclosures/015_1718_Documents.pdf).

TABLE 1
Selected Characteristics of the Indigenous Population by State/Territory (% Share of the Local Indigenous Population)

	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
Removed from natural family	4.8	11.0	7.2	7.7	11.9

Source: NATSISS, 2008.

temporary suspension of the Racial Discrimination Act. Among these were ‘income management’, a sequestering of 50 per cent or more of all welfare payments for basic needs, restrictions on the consumption of alcohol and pornography, and new limitations on Native land rights (Altman & Russell, 2012). The Australian Defence Force presence ended in October 2008 but the intervention continued until August 2012, when it was replaced by the Stronger Futures Policy. The NTER enjoyed a strong bi-partisan mandate, and the continued support of subsequent Labor governments, but many Indigenous leaders came to see it as authoritarian and paternalistic, and spoke out against it, as did others.¹⁰

SEAM was announced in June 2008, and its implementation began at the start of the following Australian school year, in March 2009. Administered by the Department of Families, Housing, Community Services and Indigenous Affairs, it aimed to raise the low school attendance rates among Indigenous Australians in the Northern Territory by conditioning income support payments on school attendance, with the ultimate goal of narrowing the economic gap between Indigenous and non-Indigenous Australians, and

interrupting the intergenerational transmission of poverty.

In its first year, SEAM formally targeted only a small number of parents receiving Centrelink (welfare) payments. Indigenous children in one of 14 schools in six trial areas, comprising 989 parents and 1,658 children, constituted a small fraction of the total Indigenous population in the Northern Territory (Table 2).

Yet SEAM was widely perceived as applying to the Indigenous population of the Northern Territory more broadly. By March 2009, when SEAM was implemented, 15,125 individuals in the Northern Territory were already subject to some form of income management (Cobb-Clark *et al.*, 2017, p. 9). A report published by the DEEWR indicated a high degree of awareness of the SEAM program among Indigenous parents in the Northern Territory, while observing that ‘parents and communities had limited understanding of the details of SEAM, and this was compounded by misinformation’ (DEEWR, 2011, p. 11). It found that parents and community members commonly, but incorrectly, believed that:

- SEAM was directed in general at Indigenous children in remote areas;
- all child-carers (including grandmothers and aunts) would have their payments suspended if they were caring for a truant child;
- Indigenous families subject to SEAM included wage-earning families and families participating in CDEP; and
- non-compliance with SEAM would trigger immediate suspension of payments (where a compliance period was actually required).

¹⁰ Broome (2010) describes an open letter against the intervention signed by 60 Aboriginal community and church organisations. However, some Indigenous leaders, notably women such as Professor Marcia Langton, expressed support for the NTER, viewing it as necessary for protecting the rights of Indigenous women and children in view of the failure of the Northern Territory government to effectively address these issues (<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	9,208	2,365	354	611
Katherine Town Camps	–	–	111	191
Hermannsburg	623	537	87	125
Wallace Rockhole	68	63	15	21
Tiwi Islands	2,579	2,267	203	336
Wadeye	2,112	1,927	219	374
Total			989	1,658

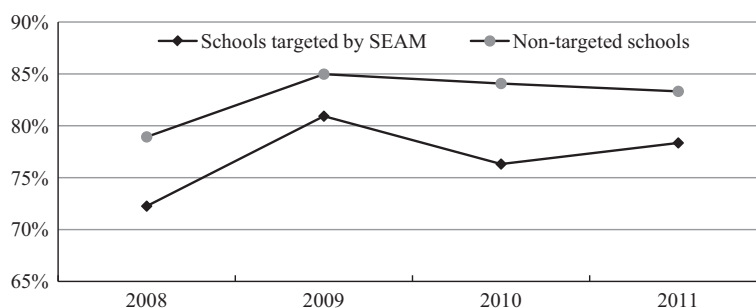
Notes: Target numbers are from DEEWR (2011). Population statistics are from the 2011 Australian Census. We found no publicly available data on the population of Katherine Town Camps, an Indigenous community located near Katherine Township.

As a result, SEAM effectively raised school attendance not only among its administratively targeted population, but in the Northern Territory in general. This is illustrated in Figure 1, which traces annual attendance rates for all students in Northern Territory schools in 2008–11, separately for the 14 schools formally targeted by SEAM, and for all other schools.

Schools targeted by SEAM were, on average, about 63 per cent Indigenous, where non-targeted schools were about 38 per cent

Indigenous. Both groups of schools exhibited an increase in attendance rates in 2009 and a subsequent tapering off, the SEAM schools starting from a lower base rate of attendance and experiencing larger changes. These observed patterns are consistent with the wider Indigenous population in the Northern Territory being affected by SEAM, as indicated by the NAPLAN participation data. However, as these school-level attendance rates are not broken down by Indigenous status or grade level (unlike the

FIGURE 1
Northern Territory School Attendance Rates, All Students, for Schools Targeted by SEAM and Non-Targeted Schools, 2008–11



Source: Authors' calculations using school-level data from My School Australia compiled by Andrew Harvey (https://github.com/andrewharvey/myschool/tree/master/data_exports). We include all primary, secondary and combined schools, omitting only a few non-targeted schools with incomplete data. The 14 SEAM schools had an average annual enrolment of 3,020 students, of whom 62.5 per cent were Indigenous; the 166 non-targeted schools had an average annual enrolment of 35,740 students, of whom 37.9 per cent were Indigenous. Attendance is calculated as the number of student-days attended as a percentage of possible student-days, for full time students in grades 1 to 10. This data does not break out school attendance by Indigenous status or grade level.

NAPLAN data) they do not represent attendance rates for Indigenous students.¹¹

Enforcement of the threat to withhold welfare payments was negligible (DEEWR, 2011). Of the 989 parents in the targeted group, 918 (1,604 children) were sent enrolment notification letters, which requested that they provide their child's school enrolment details to Centrelink, the government agency that delivers social security payments, within 14 days. Of these, as the DEEWR evaluation report notes, 170 parents (286 children) were non-compliant; and of these, 56 parents (84 children) were sent enrolment warning notices, the final step before having their benefits suspended. The majority complied, but 11 chose to move out of the target area. This was effectively the most severe sanction for non-compliance in 2009. The threats implicit in the information campaign that accompanied SEAM's initial implementation, though credible and effective at the time, were not implemented.

IV Educational Outcomes before and after SEAM: Descriptive Statistics

Our primary analysis focuses on publicly available data on NAPLAN participation rates of Indigenous children in the Northern Territory, compared to Indigenous students in other states and territories, from 2008, the year before SEAM was implemented, to 2012, along with pass rates. Table 3 presents comparative summary statistics

¹¹ The pattern revealed in Figure 1 is also consistent with findings from a DEEWR difference-in-difference analysis of the impact of SEAM on 'unauthorized absences' using proprietary, individual-level administrative data, which compared the change in attendance between students in SEAM schools and similar students in non-SEAM schools. It found a 4.29 per cent reduction in absences in 2009 in targeted government schools, and a 3.64 per cent reduction in non-targeted government schools (DEEWR, 2014, table 8.2.2). These findings are consistent with NTER/SEAM improving attendance in both targeted and non-targeted government schools, slightly more in targeted schools. (Government schools accounted for 87 per cent of Indigenous primary school enrolment in the Northern Territory in 2008; Schools Australia, 2010, table 42b.) Our finding here, of large gains in NAPLAN 2009 participation rates among the general Indigenous population of the Northern Territory, compared to other locations, similarly indicates that both targeted and non-targeted families were strongly affected. We cannot estimate a differential between targeted and non-targeted families from the aggregate NAPLAN data to which we have access.

on NAPLAN participation rates in two knowledge domains, reading and numeracy, averaged over four grade levels, 3, 5, 7, and 9, from 2008 to 2012.

The pattern of change in participation rates is similar for both knowledge domains, illustrating both the immediate impact of SEAM in 2009, and its partial dissipation in subsequent years. The dramatic increase in 2009 (19 percentage points in reading, 17 points in numeracy) was unmatched in the general Indigenous population. It nearly erased, in a single year, the large difference in participation rates between the Indigenous population in the Northern Territory and the general Indigenous population. However, subsequent years saw a decline in participation rates, so that by 2012 about a third of the initial gains remained. During this time, measures imposed under the NTER generally eased, and the threat of SEAM withholding welfare payments was evidently not carried out.

Interestingly, the sharp rise in participation rates in 2009 did not trigger a decline in pass rates, as a percentage of participating students (Table 4). The pass rate in reading actually rose by 3 percentage points, mirroring a similar rise in the broader Indigenous population, while the pass rate in numeracy fell by the same amount. Subsequent years saw further gains in reading pass rates and fluctuations in numeracy. Those induced to participate in NAPLAN achieved the minimum required level of proficiency at a similar rate to those who participated in NAPLAN before SEAM, suggesting that the increase in participation rates reflected increased learning.

Figures 2 and 3 compare the changing levels of participation in NAPLAN reading and numeracy tests among Indigenous students across Australia's eight states and territories for each grade level over time.¹² In both subjects, the percentage of Indigenous students participating in NAPLAN in the Northern Territory, indicated by the black line, follows a markedly different pattern from that of Indigenous students in Australia's other states and territories, indicated by grey lines. In 2008, before SEAM, participation in NAPLAN among Indigenous students in the Northern Territory was the lowest in Australia—for all four grade levels and both subjects. The subsequent spike in 2009 raises the Northern Territory

¹² The underlying data are in Table A1.

TABLE 3
NAPLAN Participation Rates by Knowledge Domain and Population Group, Averaged Over Grade Levels (%)

	Reading			Numeracy		
	All non-Indigenous	All Indigenous	Indigenous in NT	All non-Indigenous	All Indigenous	Indigenous in NT
2008	96	87	67	96	86	68
2009	96	89	86	96	88	85
2010	96	87	76	95	87	75
2011	96	87	77	95	86	76
2012	95	86	74	95	85	72

Source: NAPLAN (2008–12). Entries are averages over grades 3, 5, 7 and 9. The share of students participating in the NAPLAN test as a percentage of the total number of students in the year level, counting exempt students as participating, and students absent or withdrawn by their parents as non-participating. See detailed participation rates by grade level and state/territory in Table A1.

Indigenous participation share so that it is no longer the lowest of all states and territories in any grade. However, this increase falls off immediately, and in each subsequent year it is again the lowest of all states and territories in all four grade levels, and both subjects. Nonetheless, in all grade levels, NAPLAN participation rates in 2012 are noticeably higher than in 2008.

V Regression Analysis of NAPLAN Participation Rates

In this section we apply regression analysis to annual state-level NAPLAN participation data for Indigenous students in 2008–12, presented graphically in Figures 2 and 3. We use a difference-in-difference approach to estimate average annual effects of SEAM on participation rates among Indigenous students in the Northern Territory, comparing them to the corresponding changes among Indigenous students in other Australian states and territories over the 5 years, pooling all four grade levels and both knowledge domains in one regression. Indigenous families in the Northern Territory were untreated by SEAM in 2008, the year prior to implementation; then fully treated in 2009, the first year of its implementation, by the credible threat that Indigenous parents who did not send their children to school jeopardised their continued welfare support. In subsequent years, 2010, 2011 and 2012, these families were partially or ineffectively treated as the threat lost its credibility. The Indigenous populations in other states and territories are the comparison group; we assume this group is

untreated by SEAM in all years, grade levels, and knowledge domains.

Our assumption of full treatment in 2009 is based on the evidence from government reports presented in Section III, indicating that extensive misinformation generally led the Indigenous population of the Northern Territory to feel threatened by SEAM, though it was formally directed at only a small fraction of schools; and on the attendance data for SEAM and non-SEAM schools presented in Figure 1. In the context of our analysis, this is a conservative assumption. If it is an overstatement (e.g., if not all child-carers believed that their welfare payments were endangered) then our estimated effects are biased downward and the actual initial effect of SEAM on participation was stronger than our estimates indicate.

Our basic regression specification is:

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

where Y_{idgt} is the participation rate for the Indigenous population in state/territory i , knowledge domain d (numeracy or reading) and grade g (3, 5, 7 or 9), in year t (2008, ..., 2012). Here, I_r is an indicator for the reading domain (numeracy is the omitted category) and β_r is a fixed effect for reading. I_g is an indicator for grade level (grade 9 is the omitted category) and γ_g are grade-level

TABLE 4
NAPLAN Pass Rates, by Subject and Population Group, Averaged Over Grade Levels (%)

	Reading			Numeracy		
	All non-Indigenous	All Indigenous	Indigenous in NT	All non-Indigenous	All Indigenous	Indigenous in NT
2008	95	70	33	97	77	48
2009	96	73	36	97	77	45
2010	96	73	39	97	76	43
2011	96	75	39	97	79	49
2012	96	73	36	96	75	43

Source: NAPLAN National Reports, 2008–12 (<http://www.nap.edu.au/results-and-reports/national-reports.html>). Students achieving minimum standard level for their age group, as a percentage of participating students. Students absent or withdrawn by their parents are non-participating; exempt students are counted as participating but not reaching minimum standard. Entries are averages over grades 3, 5, 7 and 9.

effects, for $g = 3, 5, 7$. I_t is an indicator for year t (2008 is the omitted category) and δ_t are year effects, for years $t = 2009, \dots, 2012$. I_{NT} is an indicator for the Northern Territory and η is the Northern Territory fixed effect. The coefficients κ_t are the difference-in-difference effects for years $t = 2009, 2010, 2011$ and 2012. The last term, v_{idgt} , is an error term, which we assume to be independent across states, but possibly correlated across grade levels and domains within a state.

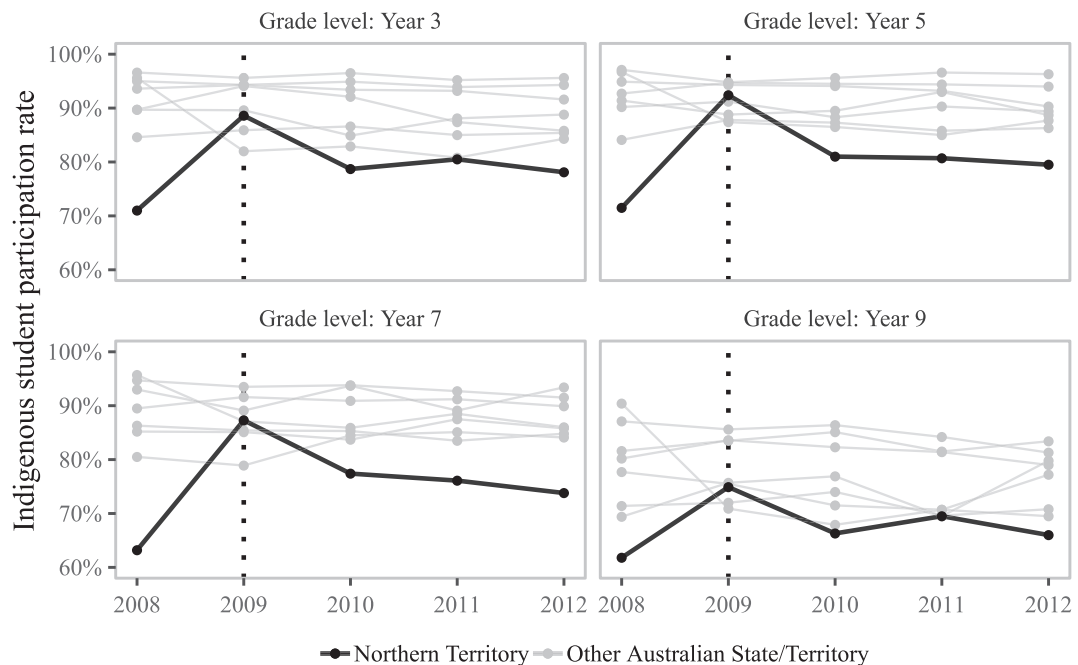
Our interest focuses on κ_t as it varies over time. This captures the difference in the difference in participation rates between the base year and year t between the Northern Territory Indigenous population and the Indigenous populations in other states and territories, averaged over all grade levels and knowledge domains. We expect a large, statistically significant, positive value for κ_{2009} , the coefficient associated with the interaction between the year 2009 and Northern Territory indicators, and smaller effects for this interaction in subsequent years.

Table 5 presents the results from a linear model with weights equal to the number of Indigenous students in each grade, domain, state, and year. As we allow observations across grade levels and domains within a state to be correlated, standard errors are clustered at the state level using the wild cluster bootstrap procedure (Cameron *et al.*, 2008). We find that the average participation rate of the Indigenous population in the Northern Territory in 2008 is almost 22 percentage points

lower than the average rate for Indigenous students in other states and territories, highlighting the relative disadvantage of the Indigenous population in the Northern Territory, in accord with the differences outlined in Section II. For all Indigenous students in Australia, participation rates in grades 3, 5 and 7 are significantly higher than those in grade 9, indicating a decline in participation in grade 9 (still in compulsory schooling) among the broader Indigenous population. We also find participation rates declining slightly over time after 2008 among all Indigenous children, mirroring a similar trend in the general population of Australia. We find that participation rates in reading are, on average, 1 percentage point higher than in numeracy, a small difference.

The difference-in-difference coefficients, which indicate the impact of SEAM and NTER on Indigenous participation in the Northern Territory as it varies over time, appear in the bottom four rows of Table 5, below the dotted line. We find a large increase of 18.3 percentage points in 2009, which then declines by half in 2010, followed by a slight rise in 2011, and again a fall in 2012 to a level 8.3 percentage points above 2008 participation rates. All the difference-in-difference estimates are significantly greater than the base year, 2008, with the point estimate for 2009 significantly different from all the other years. The estimates for 2010, 2011 and 2012 are not statistically different from each other. The slight rise in 2011 presumably echoes the strong effect registered in 2009, as students tested in

FIGURE 2
Indigenous Participation in NAPLAN Reading Tests by Year, Grade and State/Territory



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

2011 in grades 5, 7 and 9 were the same students tested in 2009, in grades 3, 5 and 7.¹³

The main drawback of our data is the absence of observations before 2008, which would have allowed us to rule out the possibility that the difference-in-difference increase in participation that we observe in the Northern Territory from 2008 to 2009 continues a prior rising trend, unique to the Northern Territory, that began before the advent of the NTER and SEAM.¹⁴ While it is possible that the NTER without SEAM generated an earlier increase in participation, in its 1 year of pre-SEAM operation, it seems inconceivable that this rise began yet earlier. Implementation of the

NTER in 2007 was a response to reports of abuse of Indigenous children in the Northern Territory, as well as concerns that school-age children were not regularly attending school. A relative rising trend in school participation rates before 2007 is not consistent with the perception of a crisis in the Northern Territory that triggered and made possible the extra-ordinary measures of the NTER (Wild & Anderson, 2007; Toohey, 2008; Broome, 2010; ch. 14).¹⁵

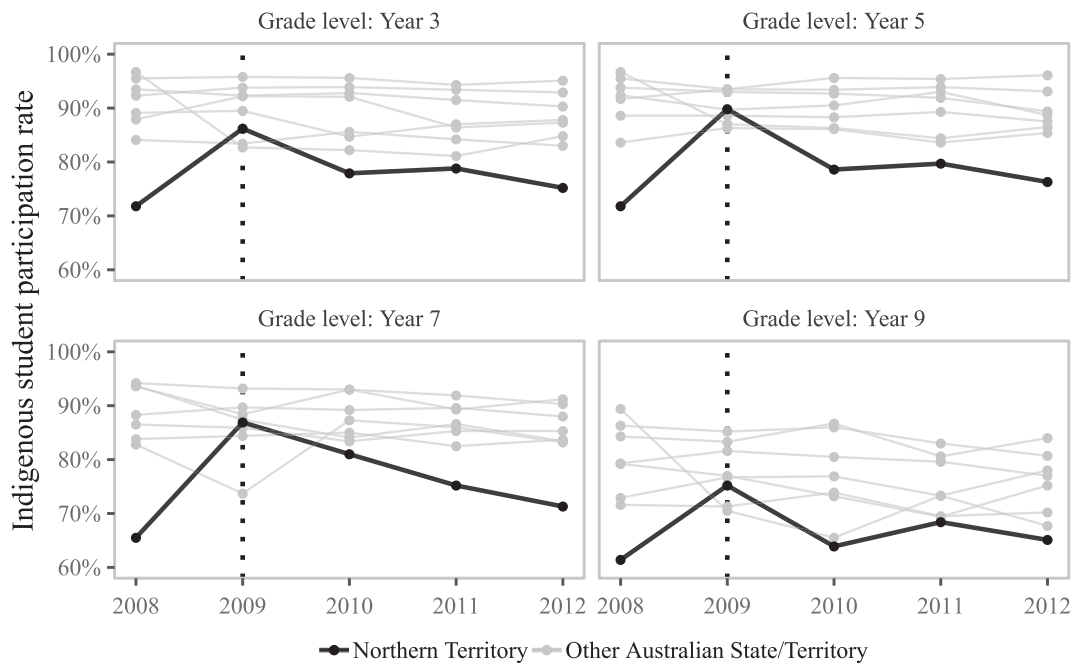
There are earlier sources of Indigenous school attendance and enrolment data, published in the annual *National Report on Schooling in*

¹³ We also estimated an unweighted regression with similar results. The interaction coefficients for 2009–12 were 0.197, 0.100, 0.115 and 0.084.

¹⁴ Of course, the decline we find in participation rates after 2009 cannot be the continuation of a trend.

¹⁵ If anything, the trend in Indigenous student participation in the Northern Territory may have been on a declining path before 2008, relative to other states and territories. If this was the case it would imply that our regressions underestimate the impact of the NTER and SEAM on participation.

FIGURE 3
Indigenous Participation in NAPLAN Numeracy Tests by Year, Grade and State/Territory



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

Australia, initially by the Ministerial Council on Education, Employment, Training and Youth Affairs (2007, 2008) and subsequently by the Australian Curriculum Assessment and Reporting Authority (Australian Curriculum, Assessment and Reporting Authority, 2010). However, these were not standardised at the time, and were not comparable across states and territories. They show no rising trend, but do not correlate well with NAPLAN participation rates in years when they overlap.¹⁶ We attribute this,

¹⁶ Table A2 presents attendance rates for the Northern Territory and Western Australia from the *National Report on Schooling in Australia* for 2007–12. The inconsistency between these series and the series depicted in Figure 1 may partly reflect differences in the underlying populations and partly differences in data collection practices between the national MySchool effort and the Northern Territory data collection efforts that fed into the *National Report*.

in the first instance, to the nature of the data: accurately recording participation in a single, nationally administered annual test is easier than reliably measuring attendance as a share of enrolment over a semester, especially when students frequently move between schools during the school year.

Relatedly, Cobb-Clark *et al.* (2017) analyse the effect of income management on individual attendance and enrolment in very remote income-managed communities, in 2006–9, using the roll-out of income management to identify a causal effect. Surprisingly, they find a decline of 2–3 percentage points after the roll-out date, and no increases. The lack of a positive effect is consistent with our interpretation, that it was the focus that SEAM placed on school attendance that effectively linked income management to school participation. The decline immediately after the roll-out might reflect more careful

TABLE 5
Regression of Indigenous Participation Rates

	Coefficient	95% confidence interval	<i>p</i> -value
Intercept	0.803	[0.745,0.861]	<0.001
Northern Territory	-0.218	[-0.262,-0.174]	<0.001
<i>t</i> = 2009	-0.003	[-0.027,0.021]	0.883
<i>t</i> = 2010	-0.006	[-0.032,0.020]	0.746
<i>t</i> = <i>t</i> = 2011	-0.013	[-0.036,0.011]	0.436
<i>t</i> = 2012	-0.023	[-0.056,0.011]	0.135
Grade 3	0.112	[0.086,0.138]	<0.001
Grade 5	0.117	[0.091,0.144]	<0.001
Grade 7	0.096	[0.080,0.113]	<0.001
Reading	0.010	[0.007,0.013]	<0.001
NT in 2009, κ_{2009}	0.183	[0.158,0.208]	<0.001
NT in 2010, κ_{2010}	0.092	[0.066,0.117]	<0.001
NT in 2011, κ_{2011}	0.102	[0.079,0.126]	<0.001
NT in 2012, κ_{2012}	0.083	[0.048,0.118]	<0.001

Notes: Linear model fit with weights for total Indigenous students in each grade, domain, state and year, pooled over all states and territories, grades, domains and years; $N = 320$; $R^2 = 0.726$. The *p*-values and confidence intervals are from bootstrapped *t*-statistics (2,000 replications) using the wild cluster bootstrap procedure clustered at the state level, implemented via the *clusterSEs* package in R (Esarey, 2015).

record-keeping, brought on by the heightened presence of government administrators.¹⁷

VI Conclusion

Australia's SEAM, implemented in 2009 against the backdrop of the NTER, aimed to raise school attendance rates among Indigenous children in the Northern Territory by threatening to withhold welfare payments from parents who failed to send their children to school regularly. The official target population was very narrowly defined but the circumstances in which SEAM was implemented (increased social control of Indigenous families, suspension of the Racial Discrimination Act, the troubled history of race relations in Australia) created a climate in which non-targeted Indigenous families in the Northern Territory also believed welfare support depended on their children regularly attending school. The combined effect of the NTER and SEAM led to an immediate increase in participation rates among the entire Indigenous population of the Northern Territory. However, this effect ebbed over time, and the decline in subsequent years erased more than half the initial gains.

¹⁷ Their findings are also consistent with the confusion and misinformation regarding the implementation of SEAM reported in DEEWR (2011). See also the related discussion in Note ¹¹ above.

We quantify these developments through a difference-in-difference regression analysis of participation rates in NAPLAN reading and numeracy tests in grades 3, 5, 7 and 9, comparing variation in these rates in 2008–12 among the Indigenous population of the Northern Territory, to their variation among the Indigenous populations of Australia's other states and territories. We use NAPLAN participation rates as a proxy for school attendance because they reflect students' active participation in education, and are available separately for Indigenous children.

Our analysis reveals that in 2009, the first year in which SEAM was implemented, test participation in the Northern Territory increased by 18.3 percentage points, beyond the average change in participation rates among the Indigenous populations of Australia's other states and territories, averaged over our four grade levels and two knowledge domains. Moreover, this rise in participation rates was not accompanied by a reduction in overall pass rates among Indigenous students, suggesting that the increase in participation rates we observe reflects a real increase in learning. However, our estimates indicate that more than half the gain dissipated in 2010, and by 2012 participation rates were only 8.3 percentage points above 2008 levels – much reduced, but still a significant increase. This ebbing may have resulted from administrators

not actually withholding welfare payments from families with truant children, undermining the credibility of the threat; from the general easing of conditions imposed by the NTER; and, of course, from parents not finding sufficient benefit in their children's schooling to ensure their continued attendance when they no longer felt threatened.

The gains achieved through the joint implementation of the NTER and SEAM are not easily replicable elsewhere. They were made possible by unique circumstances that allowed credible coercion through an initial military presence, income management, and the temporary suspension of anti-discrimination laws. Yet even with such strong measures at its disposal, the government achieved only partial success with regard to its stated goals. It was able to induce large numbers of Indigenous parents to begin sending their truant children to school in 2009, but most of the gains dissipated in subsequent years. At most, the NTER and SEAM provided a window of opportunity in which parents and their truant children were induced to experience school participation. For many, this was not sufficient to ensure sustained attendance.

These measures effectively placed all responsibility for poor school attendance on the family, ignoring the possibly contributing role of schools, as well as general economic and social conditions. Sustained change may require greater change in the schools serving these populations, aligning them more closely with Indigenous cultural traditions and the needs of the hybrid Indigenous economy. It may require directly addressing circumstances in the home that interfere with regular attendance. No less important, better employment prospects for these children when they graduate from school would also provide a stronger incentive for regular school attendance.

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Appendix

TABLE A1
Annual NAPLAN Participation Rates, Indigenous Students, by Grade Level, State/Territory and Subject, 2008–12

State/Territory	Reading					Numeracy				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Grade 3										
Northern Territory	0.71	0.89	0.79	0.81	0.78	0.72	0.86	0.78	0.79	0.75
Western Australia	0.85	0.86	0.87	0.85	0.85	0.84	0.83	0.86	0.84	0.83
Queensland	0.95	0.94	0.93	0.93	0.92	0.94	0.92	0.93	0.92	0.90
New South Wales	0.94	0.94	0.95	0.94	0.94	0.92	0.94	0.94	0.93	0.93
Victoria	0.90	0.90	0.85	0.88	0.89	0.89	0.89	0.85	0.87	0.88
South Australia	0.96	0.82	0.83	0.81	0.84	0.97	0.83	0.82	0.81	0.85
Tasmania	0.97	0.96	0.96	0.95	0.96	0.95	0.96	0.96	0.94	0.95
Australian Capital Territory	0.90	0.94	0.92	0.87	0.86	0.88	0.92	0.92	0.86	0.87
Grade 5										
Northern Territory	0.71	0.92	0.81	0.81	0.80	0.72	0.90	0.79	0.80	0.76
Western Australia	0.84	0.88	0.87	0.86	0.86	0.84	0.86	0.86	0.84	0.85
Queensland	0.95	0.94	0.94	0.93	0.90	0.94	0.93	0.93	0.92	0.89
New South Wales	0.93	0.95	0.94	0.94	0.94	0.92	0.94	0.93	0.94	0.93
Victoria	0.90	0.91	0.88	0.90	0.89	0.89	0.89	0.88	0.89	0.88
South Australia	0.97	0.87	0.87	0.85	0.88	0.97	0.87	0.86	0.84	0.87
Tasmania	0.97	0.95	0.96	0.97	0.96	0.95	0.94	0.96	0.95	0.96
Australian Capital Territory	0.91	0.89	0.89	0.93	0.89	0.92	0.90	0.90	0.93	0.89
Grade 7										
Northern Territory	0.63	0.87	0.77	0.76	0.74	0.65	0.87	0.81	0.75	0.71
Western Australia	0.86	0.85	0.85	0.83	0.85	0.84	0.84	0.85	0.82	0.84
Queensland	0.95	0.94	0.94	0.93	0.92	0.94	0.93	0.93	0.92	0.90
New South Wales	0.89	0.92	0.91	0.91	0.90	0.88	0.90	0.89	0.90	0.88
Victoria	0.85	0.85	0.84	0.88	0.86	0.87	0.86	0.83	0.85	0.85
South Australia	0.96	0.87	0.86	0.88	0.86	0.94	0.87	0.84	0.87	0.83
Tasmania	0.93	0.89	0.94	0.89	0.93	0.94	0.88	0.93	0.89	0.91
Australian Capital Territory	0.81	0.79	0.85	0.85	0.84	0.83	0.74	0.87	0.86	0.83
Grade 9										
Northern Territory	0.62	0.75	0.66	0.69	0.66	0.61	0.75	0.64	0.68	0.65
Western Australia	0.71	0.72	0.74	0.70	0.71	0.72	0.71	0.74	0.69	0.70
Queensland	0.87	0.86	0.86	0.84	0.81	0.86	0.85	0.86	0.83	0.81
New South Wales	0.80	0.84	0.82	0.81	0.79	0.79	0.82	0.81	0.80	0.77
Victoria	0.78	0.75	0.71	0.71	0.77	0.79	0.77	0.73	0.69	0.75
South Australia	0.90	0.71	0.68	0.71	0.69	0.89	0.70	0.65	0.73	0.68
Tasmania	0.82	0.83	0.85	0.81	0.83	0.84	0.83	0.87	0.81	0.84
Australian Capital Territory	0.69	0.76	0.77	0.69	0.80	0.73	0.77	0.77	0.73	0.78

Source: NAPLAN (2008–12).

TABLE A2

Indigenous attendance rates in government schools, Northern Territory (NT) and Western Australia (WA), 2007–12

	Grade 3		Grade 5		Grade 7		Grade 9	
	NT	WA	NT	WA	NT	WA	NT	WA
2007	0.73	0.82	0.75	0.82	0.75	0.82	0.71	0.68
2008	0.73	0.77	0.74	0.76	0.73	0.81	0.70	0.79
2009	0.74	0.69	0.76	0.78	0.72	0.73	0.66	0.80
2010	0.73	0.81	0.74	0.81	0.70	0.81	0.60	0.84
2011	0.72	0.81	0.73	0.76	0.70	0.80	0.61	0.78
2012	0.72	0.81	0.72	0.86	0.68	0.82	0.60	0.82

Sources: Data for 2007 from MCEETYA (2007) (table 37); data for 2008–12 from Australian Curriculum, Assessment and Reporting Authority (2012).