*Part 4*

The Importance of Creating and Building an Evidence Base

—

**Chapter**

# 9

# How much evidence is in Australia's evidence-based policy? The case of expanding early childhood education

—

*Professor Marco Castillo & Professor Ragan Petrie*

The Australian government invests billions of dollars in programs to help various populations increase their economic prosperity. How much evidence is behind the benefit-cost of these programs? Using data on the population of Australian children, we show that increased preschool enrolment during the expansion of funded preschool for four-year-olds is associated with no, or negative, effects on measures of school readiness. These findings are worrisome and highlight the urgency of rethinking the process of moving forward with large-scale policies to improve child outcomes in the absence of rigorous causal evidence of effectiveness.

# POLICY RELEVANCE FOR AUSTRALIA

Every policy brief arguing for expansion of early childhood education cites the enormous and consistent returns from the Perry Preschool Project (see Elango et al., 2015, for a review). Australia is no exception (Fox and Geddes, 2016; The Front Project, 2019; Nous Group, 2020). Perry Preschool was a randomised controlled trial (RCT) that provided high-quality preschool education to a small sample of low-income children in the early 1960s. RCTs are considered the gold standard for policy evaluation because they provide direct, causal evidence of the effectiveness of a policy. While the returns to Perry are impressive, comparable to that of the stock market (Garcia et al., 2021), it remains unclear how generalisable these returns are to other contexts and populations.

The returns from Perry have been heralded as justification for country-wide, universally funded preschool, even though there has been no RCT measuring the returns to such a far-reaching policy.[2] Indeed, the existing evidence on returns from preschool programs are most remarkable for disadvantaged children (Cascio, 2021; Elango et al., 2015), suggesting that returns would not be uniform across all children and might not merit the cost of a universally funded program. The expansion of child care in Canada showed the overall effect was negative in the short and long term (Baker et al., 2008, 2019).

Not all eligible children for preschool end up enrolling, even in funded programs. In the United States, enrolment in the two major universal state preschool programs in Georgia and Oklahoma was 59 percent and 74 percent, respectively (Cascio and Schanzenbach, 2013). In Australia, low-income families are less likely to have their child enrolled in preschool for four-year-olds compared to higher-income families (80 percent for those earning A$26,000/year versus 90 percent for those earning A$52,000/year).[3] Evidence from the roll-out of universal preschool in Germany suggests that the children who would benefit the most from going to preschool are the least likely to attend (Cornelissen et al., 2018).

Australia expanded funded preschool to four-year-olds in 2008, and the state of Victoria is currently rolling out funded preschool to three-year-olds under the argument that 'two years are better than one' (Fox and Geddes, 2016, p.5). Recently, New South Wales (NSW) and Victoria announced funded preschool would extend to 30 hours a week (from the current 15) for four-year-olds (Kolovos, 2022). Over A$9 billion is committed over the next decade in Victoria for early childhood education, and NSW has committed A$5.8 billion to expand four-year-old education.

The status quo in Australia is to conduct ex-ante and ex-post policy evaluation that relies on statistical methods. These methods are not designed to provide actual, causal evidence of a program's effectiveness, but rather are an approach to deal with non-experimental data. Causal evidence of the effectiveness of policies could be achieved via small-scale pilots and RCTs conducted prior to implementing large-scale policy changes, with careful attention paid to the viability of scaling up to the population (see List, 2022, for an excellent discussion of the challenges to scaling). Alternatively, estimates of the returns to a policy at scale can be obtained, under some assumptions, if rich individual-level, linked data measuring inputs and outputs are available.

It may be premature to implement such large-scale, funded preschool programs in Australia. The evidence to date on the potential effects of funded preschool of four-year-olds is based on statistical methods using data from the representative sample of children in the Longitudinal Study of Australian Children (Warren and Haisken-DeNew, 2013).[4] These analyses rely on matching methods. The underlying assumption is that children with the same observable characteristics, that is, age, gender, household income, etc., can be matched and those who went to preschool can be compared to those who did not to estimate the effects of preschool on educational outcomes. This would work as long as no other relevant factors that might explain school readiness are left out. If there are other important factors that are not measured, that is, parental motivation for their child to succeed, and parental investments in their child and home environment, then results from these analyses will be misleading.

To our knowledge, no randomised evaluation or roll-out of these universal preschool programs has been done or is planned. The case for universally funded preschool in Australia is in need of further study. We offer a population-level analysis of preschool expansion on measures of child development. Our findings show no, or negative, effects of preschool on the outcomes of Australian children.

[2] There have been US state-level RCTs on universal preschool, but nothing at a country level (Cascio and Schanzenbach, 2013). See also Gray-Lobe et al. (2021) for a recent evaluation of universal preschool in Boston, United States.

[3] Authors' estimations are based on Australian Bureau of Statistics (ABS) Census data.

[4] A cost–benefit analysis of the returns to preschool (The Front Project, 2019) uses three studies, including Warren and Haisken-DeNew (2008), Magnuson and Duncan (2013) and Centre for Education Statistics and Evaluation Department of Education (2017). The assumed effect size of preschool on schooling outcomes (0.17 SD) is relatively optimistic if we consider that the effect size for Head Start is 0.37 SD for disadvantaged families that would have not attended pre-school and zero for households with access to alternative options (see Kline and Walters, 2016). Our approach of using population data, and no assumptions on matching individuals on observables, provides an accurate picture of the effects of increasing preschool enrolment on school readiness of the population of Australian children at the level of a local government area (LGA).

# FRAMING THE ISSUE

Without data from a RCT that encourages some children to attend preschool more than others, our analysis uses currently available data on the population of Australian children to assess if an increase in enrolment in four-year-old preschool is associated with a change in school outcomes. We note this is not causal but has the advantage that it illustrates associations at the population level for children who did and did not attend preschool and controls for differences across regions.

To set the stage for the analysis, consider the thought experiment in which two identical communities, that is, LGAs,[5] experience different growths in preschool enrolment. If preschool has a positive effect on child development, we expect that the community with more children attending preschool will have better child development outcomes. Of course, no two communities are identical. The best we can do is to verify that those communities that increase enrolment in preschool relatively more also present relatively greater increases in measures of child development of the population of children in the community.

Before we continue, though, we should consider how an expansion of funded preschool might yield different returns on child development depending on the background of the children brought in by the policy. Consider one scenario where children already enrolled in preschool might be there because parents recognise some difficulties that have to be amended. If this is the case, new children encouraged to enter preschool because of the policy might be better prepared for school already and would likely benefit less from preschool than those already enrolled. In this scenario, preschool enrolment increases, but there is no effect on average child development at school entry of the population.

In another scenario, children already enrolled in preschool might be there because parents from more advantaged families have enrolled them to free up their time so they can work. These children are likely to be better prepared for school anyway since their parents have resources to provide a richer household environment. If this is the case, children who enter preschool because of the policy might be ex ante worse prepared for school and benefit most from attending preschool. In this scenario, preschool enrolment increases, and if preschool helps these new entrants, child development measures at school entry would improve. However, if preschool does not help these new entrants, no improvement would be seen in child development at school entry.

These simple arguments illustrate that if we only look at the outcomes of children who attended preschool, and not the entire population of children, we will likely have results that do not measure the effect of preschool itself on child development. Worse yet, we won't be able to determine the direction of the bias. To assess the effect of the increase in preschool enrolment on child development, we need measures of child development for children who attended preschool and who did not attend preschool. By measuring the development of all children in the population, we can then assess if increased preschool enrolment leads to better or worse outcomes in the population of children entering school. This assumes that the overall change in child development is due only to those entering the preschool system.

It is not clear what effect an increase in preschool enrolment might have on child development at school entry. It is possible to see worse outcomes if, for instance, an increase in preschool enrolment leads to a deterioration in the quality of preschool overall. In this case, both children who enter because of the policy and children who would have attended preschool anyway will be worse off.

Our analysis allows us to determine the relationship between an increase in preschool enrolment in a LGA and child development in the LGA for the population of Australian children. If we observe that increasing preschool enrolment is associated with no change in child development, this means that having more children in preschool did not improve the development of Australian children.

As we show in the next section, Australia has population-level data that allow us to assess whether more preschool is associated with better or worse school outcomes.

[5] LGAs are used as the unit of observation in our analysis because both ABS Census data and the Australian Early Development Census are aggregated into LGAs and can therefore be matched. LGAs are an ABS Mesh Block approximation of gazetted local government boundaries as defined by each state and territory. As of 2022, there are 566 LGAs covering the whole of Australia, including unincorporated areas, without gaps or overlaps.

# DATA CONSTRUCTION

We take advantage of two high-quality sources of information. The Australian Census of the population of 2011, 2016 and 2021, and the Australian Early Development Census (AEDC) of 2012, 2015, 2018 and 2021.[6] The most disaggregated level at which the data are available from both sources, and then can be matched, is at the LGA level. The results reported use the LGA as the unit of observation. The Census reports enrolment in preschool by LGAs for different age groups. The AEDC evaluates all children entering school on a series of measures of child development to assess school readiness. Combining these two datasets therefore gives us the possibility to assess changes in school readiness and changes in preschool enrolment at the population level.

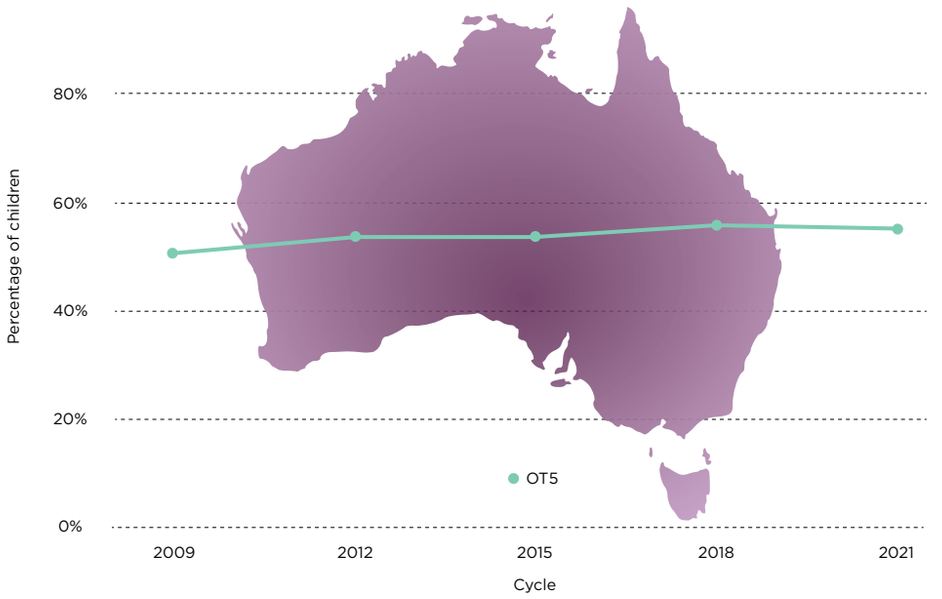
## The AEDC data

The Department of Education describes the AEDC as follows:[7]

**"The AEDC is a national assessment conducted every 3 years to examine how children have developed by the time they start school. The AEDC highlights what is working well and what needs to be improved or developed to support children and families. The AEDC was first conducted nationally in 2009. Around 300,000 children have been included in each collection of the AEDC, totalling around 1.5 million children. Data is collected by teachers of children in their first year of school. Teachers respond to around 100 questions that measure early childhood development across 5 key areas known as domains. Children are allocated a score against the domains to determine whether they are developmentally on track, at risk or vulnerable."**

The five AEDC domains are physical health and wellbeing, social competence, emotional maturity, language and cognitive skills (school-based), and communication skills and general knowledge. The most recent AEDC data collection was undertaken between May and July 2021. Nationally, data were collected on over 305,000 children in their first year of full-time school and from approximately 7,500 primary schools. At a national level, Figure 1 shows that the percentage of children who were on track on all five domains has remained mainly flat over the past 12 years and decreased from 55.4 percent in 2018 to 54.8 percent in 2021. Results from the AEDC also show a slight increase in the proportion of children who are developmentally vulnerable. Children assessed as developmentally vulnerable on one or more domains increased from 21.7 percent in 2018 to 22 percent in 2021. Children assessed as developmentally vulnerable on two or more domains also increased from 11 percent in 2018 to 11.4 percent in 2021.[8]

**Figure 1.**
Percentage of Australian children on track on all five AEDC domains.




Source: AEDC data from Data Explorer: https://www.aedc.gov.au/early-childhood/findings-from-the-aedc

6 We do not use the 2009 AEDC data because we could not access Census data for 2006.

7 https://www.aedc.gov.au/about-the-aedc

8 https://www.aedc.gov.au/about-the-aedc

## The Census data

Using the preschool enrolment data from the Census, we are able to match 546 LGAs, out of 562 LGAs in the country, to the AEDC data. After accounting for additional data loss across years, we use 493 LGAs in our final analysis.[9]

### DESCRIPTION OF THE ESTIMATION APPROACH

To estimate the relationship between enrolment in preschool and child development we constructed a dataset that includes the outcomes for each AEDC indicator by LGA. We added to that dataset the best approximation of the number of children who attended preschool in the year prior to the AEDC. We did this by calculating the proportion of children aged between three and four whose parent(s) reported the child attending a preschool in the Census data. Since the Census takes place in different years than the AEDC, we used simple extrapolation to approximate the proportion of children attending preschool in each year.

We rely on Census data for two main reasons. First, answering the Census survey is mandatory and therefore less likely to suffer from underreporting. Second, answers from the Census data are less likely to be biased due to changes in reporting policy. The ABS has improved annual reporting of preschool enrolment by service providers since 2016.[10] Using these latter data would likely overestimate the changes in attendance due to increased effort in collecting data. Parents reporting to the Census are less likely to be affected by these changes in policy.

A simple correlation between the AEDC results from a LGA for a given year and enrolment in preschool from the Census data for the previous year is likely to produce uninformative results. For instance, more advantaged LGAs will likely have higher enrolment levels and better AEDC outcomes even if preschool is ineffective. This is because more advantaged LGAs attract populations with better resources to provide a rich home environment for children. To avoid this issue, our analysis uses changes in enrolment and changes in AEDC results. Changes remove factors that might exist in some areas but not others. Our analysis then focuses on the outcomes of those entering or exiting the preschool market. These children face the same local conditions as those already enrolled in preschool and enable us to better detect a relationship that is not spurious due to unaccounted for factors.

### LIMITATIONS OF OUR ANALYSIS

The main limitation of the current analysis is that it is based on non-experimental, observational data. The data are not generated from a RCT or other exogenous changes in preschool enrolment. This means that we cannot disentangle the effects of increased enrolment from other factors that might be influencing outcomes at the same time. For instance, we do not know if LGAs that increased enrolment faced events that coincided with these changes, or lack of changes, in school readiness. There is no way to know if such events might explain what we observe, given the data that are currently available.

The second limitation of the current analysis is the inability to determine potential mechanisms behind the reported results. This is due to a lack of data. For instance, we do not have a way to determine if the increase in enrolment is concomitant with a decrease in the quality of preschool. At the time of writing, we are unable to access data on the average quality of preschools over time. This could be a mediating factor that would explain the associated null or negative effects of preschool enrolment and child development indicators. Having access to these data, as well as unit-level data on the child, would help to determine what is driving our results at the population level.

[9] Some LGAs could not be matched because the LGA was split or combined with another LGA. The final analysis is conducted on data from 493 LGAs. Data loss is due to no reported AEDC data for that LGA. The AEDC does not report data for a LGA if fewer than 15 children had valid AEDC scores, less than two teachers had completed instruments for children in that location, or instruments were completed for less than 80 percent of all non-special-needs children.

[10] The ABS collects data yearly on preschool education from centres for the National Early Childhood Education and Care Collection, https://www.abs.gov.au/statistics people/education/preschool-education-australia/latest-release.

# ANALYSIS AND KEY INSIGHTS

Figure 2 presents the relationship between preschool enrolment the year prior and AEDC school readiness measures. This is estimated from regression analysis.[11] These results are based on the 493 LGAs we were able to match across the Census years. The figure reports the effect of a 10-percentage-point increase in preschool enrolment on AEDC measures of child development. The first five items listed along the x-axis are the disaggregated AEDC measures of health, social, emotional, language and communication factors. The last two are the percentages of children with no vulnerabilities or at most one vulnerability. The dots represent the change in the measure for a 10-percentage-point increase in enrolment. The maroon horizontal line represents no change in the measure.

How do we interpret these results? Figure 2 shows that a 10-percentage-point increase in preschool enrolment is associated with a half-a-percentage-point decrease in the proportion of children on track on the health domain of the AEDC. Similarly, a 10-percentage-point increase in preschool enrolment is associated with roughly a half-a-percentage-point decrease in the proportion of children on track in any of the AEDC domains. The bars attached to each estimate tell us if these effects are large enough to be considered significant. The figure shows that these estimates have a 10 percent chance of being observed if enrolment actually did not have an effect on AEDC outcomes. In other words, these effects are too large to be just due to chance. The last two columns show the results regarding the proportion of children with no vulnerabilities and at most one vulnerability. The estimates also show a negative relationship between preschool enrolment and AEDC outcomes; however, these estimates are noisy and not statistically significant.[12]

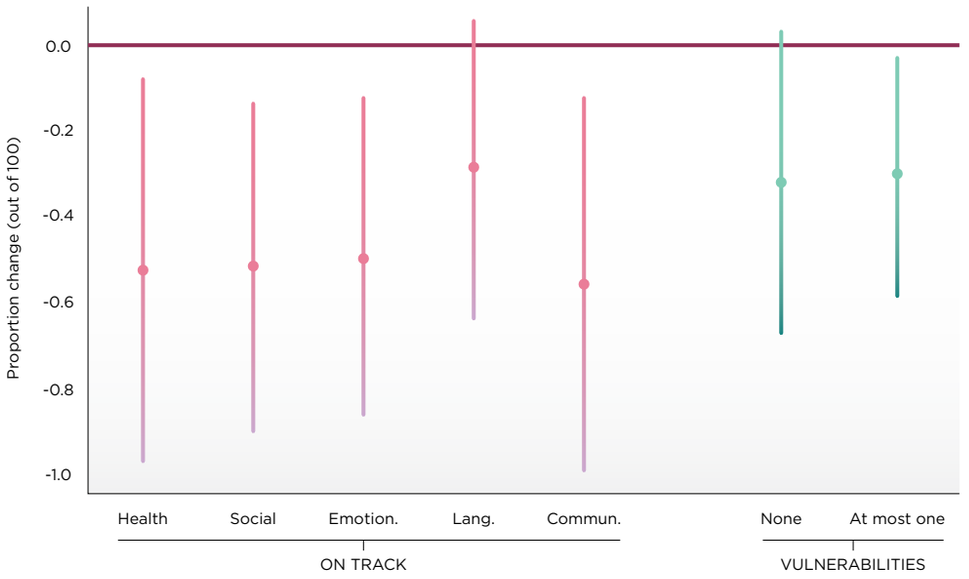
To put these results in perspective, in 2021, 54.8 percent of children were on track in all five domains, that is, presented no vulnerabilities, according to the AEDC. If a LGA increased preschool enrolment by 20 percentage points, the percentage of children with no vulnerabilities would decline by 0.7 of a percentage point to 54.1 percent. While the change in the percentage of children presenting no vulnerabilities may not have moved by much, it still represents a negative, or null, change in child development. This is from the expansion of a program that costs billions of dollars and is designed to yield better school readiness outcomes for children.

Thus, in the Australian population, an increase in preschool enrolment in the previous year is associated with a decrease in all five school readiness indicators.

Figure 2 shows that LGAs with relatively higher growth in preschool enrolment are faring worse than areas with slower growth. Before we discuss these results further, it is important to note that these results cannot be attributed to a compositional change in children responding to the AEDC because the AEDC is a population census. Nor is it due to only having measures of child development from children enrolled in preschool. The analysis looks at the population of children entering primary school, so we observe measures of child development for those who went to preschool and those who did not. The results show that the outcomes of the average child in a LGA, not the outcomes of the marginal entering child, are relatively worse as preschool enrolment increases. These results are therefore concerning for both Australian children and the cost-effectiveness of preschool expansion.

One might be concerned that some effects of preschool might be delayed or that the AEDC is not sensitive enough to capture developmental changes. We find no evidence to suggest this is the case. We also looked at educational outcomes further in the future, after initial school enrolment. For instance, increases in preschool enrolment in previous years have no effect on year 3 Naplan scores.

**Figure 2.**
Relationship between preschool enrolment and school readiness indicators.




Notes: Each dot represents the average proportional change in each AEDC measure, no vulnerabilities and at most one vulnerability for a 10 percentage-point increase in preschool enrolment. The lines around the average represent standard errors. The maroon horizontal line represents no effect.

[11] Specifically, we use ordinary least squares regressions to regress the outcome of interest, that is, an indicator of being on track for each of the five indicators and being on track for two, on lagged preschool enrolment in the year prior and dummy variables for each LGA and each year the data are available.

[12] Estimates weighted by the population in the LGA show similar trends. The effects on all five indicators and on vulnerabilities show no significant effect of an increase in preschool on the school readiness of Australian children.

[13] https://www.aedc.gov.au/early-childhood/findings-from-the-aedc

Relating these results to previous research on the impact of early childhood education on childhood development, we can suggest some potential hypotheses for these findings. It is possible that children entering preschool would have been better off either staying at home or attending day care. This is consistent with the evidence that the returns to preschool are not universally positive as shown by research on the expansion of preschool in Germany (Cornelissen et al., 2018) and Canada (Baker et al., 2008, 2019). Another possibility is that the expansion of preschool is accompanied by a decrease in quality. This can happen if new preschools are of lower quality or new teachers are less prepared. In this case, even if children would benefit from preschool, the lower quality of services might lead to a decrease in AEDC outcomes.

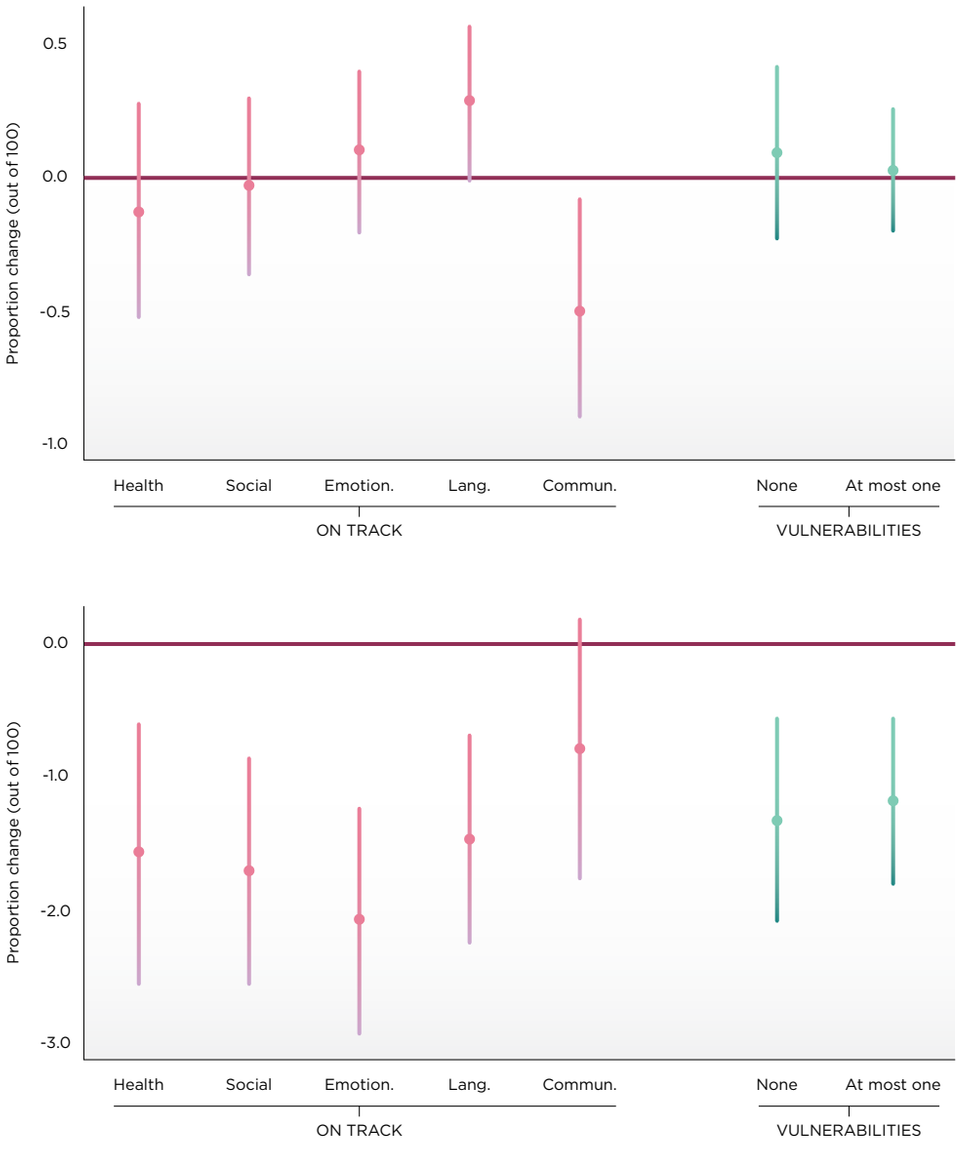
Are the negative or null effects of preschool on school readiness indicators evident in all LGAs? The analysis presented so far looks at results over all LGAs in Australia. It is possible that some states have been able to increase the supply of preschool without loss of quality. To get a sense of regional differences, we split LGAs between those in Victoria and NSW and those not in these two states. Figure 3 reports these results. We see a clear difference between preschool enrolment and child development by region.

In Victoria and NSW, the expansion of preschool has not been accompanied by an overall decrease in AEDC outcomes. If anything, these two states show that the increase in preschool enrolment has had no effect on AEDC outcomes. This contrasts with the rest of the nation. Preschool expansion in other states is associated with a decrease in AEDC outcomes.

Thus, in Victoria and NSW, the increase in preschool enrolment in the prior year is associated with no change in overall school readiness, but in the rest of the country, it is associated with a decline in school readiness.

We should note that the average LGA in Victoria and NSW has increased preschool enrolment from 69 percent in 2015 to 90 percent in 2021. LGAs not in these two states have increased enrolment from 46 percent in 2015 to 60 percent in 2021.

**Figure 3.**
Relationship between preschool enrolment and school readiness indicators, by LGAs in Victoria and NSW (Panel A) and the remaining states (Panel B).




Notes: Each dot represents the average proportional change in each AEDC measure, no vulnerabilities and at most one vulnerability for a 10 percentage-point increase in preschool enrolment. The lines around the average represent standard errors. The maroon horizontal line represents no effect.

# INFORMING POLICY

The Australian Commonwealth and state governments are vested in increasing enrolment into preschool and thereby improving children's school readiness.[14] Our results provide a cautionary note on the benefits of preschool as it is currently implemented. The findings show that the expansion of preschool has had, at best, neutral results in terms of child development measures for some children and, at worst, bad outcomes for others.[15] This calls for investment in rigorous research to understand what works in early childhood education and how to improve child outcomes through the expansion of preschool. As we noted at the start of this chapter, the evidence on the benefits of universal early childhood education is mixed. The evidence presented here for Australia coincides with that assessment.

The findings presented in this chapter are not without precedent. Several high-quality early childhood interventions fail to scale up (Andrew et al., 2018; Attanasio et al., 2020). The economics of the scale-up problem are now well understood (see List, 2022). There is potentially a loss of quality as programs expand and marginal resources are used up due to supply constraints in the short term. For instance, there may be a sufficient supply of high-quality teachers for a small preschool program but not enough as the program scales up to reach more children. Then, the average quality of teachers and preschools would decline.

Big investments require proper prospecting. For instance, oil companies typically spend US$3/barrel in exploration before any drilling is started.[16] Shouldn't public investment of the magnitude of preschool expansion require a fraction of what industry is willing to pay to avoid costly mistakes? This does not imply government should not invest in children. On the contrary, there is evidence that high-quality preschools delivered at small scale to targeted groups can have sizeable and positive returns to child development (see Elango et al., 2015; Castillo et al., 2020; Fryer et al., 2020). However, investments should be made smartly, based on scientific evidence and take into account how program delivery will be affected as programs scale up.[17]

More work can be done to understand the barriers that prevent the realisation of the benefits of early childhood education, even if there is not a taste by government to run RCTs. Access to unit-level administrative data that link preschool attendance to location and later outcomes can help map who would benefit most from attending preschool and who would benefit most from subsidies to attend preschool. Some children might benefit from going to preschool, others might benefit from staying at home. There are potentially enormous gains from linking datasets but also from linking RCTs to longitudinal datasets. The AEDC should be collected annually, not every three years, to properly assess the school readiness of preschool expansion. Preschool affects not only the child attending school, but also their siblings and families. Spillover effects are also likely to materialise (List et al., 2019). We should expect that if results are positive, more families will enrol their kids in preschool. But, the opposite is also true: no visible gains from program participation might make it difficult for good policies to be adopted.

Our findings are based on population-level data that are disaggregated to the lowest level possible and still allow us to link preschool enrolment rates to school readiness measures. Data at the child level, combined with measures of school quality and preschool attendance, would improve the analysis immensely, although it would still be associations and not show the causal impact of increased enrolment on school readiness.

Thus far, the findings are troubling. They point to the importance of building in small-scale RCTs of potential programs prior to rolling them out at scale to understand what causal impact the program has on child development outcomes. These studies would help determine who would benefit from the program and what aspects of the program need to be improved for maximum impact. Without this evidence, money may be spent unwittingly on programs for Australian children that have no effect when the money could have been spent on alternative programs that yield positive results. Incorporating RCTs in the piloting phase and during roll-out would provide the evidence Australia needs to provide effective, evidence-based policies.

14 See https://www.dese.gov.au/child-care-package/preschool/preschool-reform-funding-agreement and https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/BudgetReview202122/UniversalAccessToPreschool

15 Preschool expansion may have had other effects, such as freeing up labour time for parents. The key goal of the preschool expansion is to better prepare children for school. Thus, our analysis is focused on that outcome.

16 https://www.reuters.com/article/us-oil-exploration-risk-analysis/oil-exploration-costs-rocket-as-risks-rise-idUSTRE61A28X20100211

17 The need for RCTs has been voiced before in Australia (Center for Education Statistics and Evaluation, 2018).

# REFERENCES

Andrew, A., Attanasio, O., Fitzsimons, E., Grantham-McGregor, S., Meghir, C. and Rubio-Codina, M. (2018) 'Impacts 2 Years After a Scalable Early Childhood Development Intervention to Increase Psychosocial Stimulation in the Home: A Follow-up of a Cluster Randomized Controlled Trial in Colombia', *PLOS Medicine*, vol. 15, no. 4, pp. 1–19.

Attanasio, O., Cattan, S., Fitzsimons, E., Meghir, C. and Rubio-Condina, M. (2020) 'Estimating the Production Function for Human Capital: Results from a Randomized Controlled Trial in Columbia', *American Economic Review*, vol. 110, no. 1, pp. 48–85.

Baker, M., Gruber, J. and Milligan, K. (2008) 'Universal Child Care, Maternal Labor Supply and Family Well-Being,' *Journal of Political Economy*, vol. 116, no. 4, pp. 709–45

Baker, M., Gruber, J. and Milligan, K. (2019) 'The Long Run Impacts of a Universal Child Care Program', *American Economic Journal: Economic Policy*, vol. 11, no. 3, pp. 1–26.

Cascio, E. (2021) 'Early Childhood Education in the United States: What, When, Where, Who, How, and Why', NBER Working Paper 28772.

Cascio, E. and D. Schanzenbach (2013) 'The Impact of Expanding Access to High-Quality Preschool Education', Brookings Papers on Economic Activity.

Castillo, M., List, J., Petrie, R. and Samek, A. (2020) 'Detecting Drivers of Behavior at an Early Age: Evidence from a Longitudinal Field Experiment', NBER Working Paper 28288.

Center for Education Statistics and Evaluation (2018), *A Review of the Effects of Early Childhood Education*, New South Wales Department of Education, Sydney.

Cornelissen, T., Dustmann, C. and Schonberg, U. (2018) 'Who Benefits from Universal Child Care? Estimating Marginal Returns to Early Child Care Attendance', *Journal of Political Economy*, vol. 126, no. 6, pp. 2356–409.

Duncan, G. and K. Magnuson (2013) 'Investing in Preschool Programs,' *Journal of Economic Perspectives*, vol. 27, no. 2, pp. 109–32.

Elango, S., Garcia, J.L., Heckman, J.J. and Hojman, A. (2015) 'Early Childhood Education, Human Capital and Economic Opportunity', Global Working Group Working Paper 2015-017.

Fox, S. and Geddes, M. (2016) *Preschool – Two Years Are Better Than One: Developing a Preschool Program for Australian 3 Year Olds: Evidence, Policy and Implementation*, Mitchell Institute Policy Paper No. 03/2016, Mitchell Institute, Melbourne.

Fryer, R.G., Levitt, S.D., List, J.A. and Samek, A. (2020) 'Introducing CogX: A New Preschool Education Program Combining Parent and Child Interventions', NBER Working Paper No. 27913.

Garcia, J., Bennhoff, F., Leaf, D.E. and Heckman, J. (2021) 'The Dynastic Benefits of Early Childhood Education', NBER Working Paper 29004.

Gray-Lobe, G., Pathak, P. and Walters, C. (2021) 'The Long-term Effects of Universal Preschool in Boston', NBER Working Paper 28756.

Kline, P. and Walters, C. (2016) 'Evaluating Public Programs with Close Substitutes: The Case of Head Start', *Quarterly Journal of Economics*, vol. 131, no. 4, pp. 1795–848.

Kolovos, B. (2022) 'Victoria and New South Wales Announce Overhaul of Preschool Education with Extra Year of School'. https://www.theguardian.com/australia-news/2022/jun/16/victoria-and-nsw-to-announce-overhaul-of-preschool-education

List, J. (2022) *The Voltage Effect: How to Make Good Ideas Great and Great Ideas Scale*, Currency, New York.

List, J., Momeni, F. and Zenou, Y. (2019) 'Are Estimates of Early Education Programs Too Pessimistic? Evidence from a Large-Scale Field Experiment that Causally Measures Neighbor Effects', SSRN Working Paper.

Nous Group (2020) *UANP Review: Final Review Report*, COAG Education Council.

The Front Project (2019) *A Smart Investment for a Smarter Australia: Economic Analysis of Universal Early Childhood Education in the Year Before School in Australia*, PricewaterhouseCoopers.

Warren, D. and Haisken-DeNew, J. (2013) *Early Bird Catches the Worm: The Causal Impact of Pre-school Participation and Teacher Qualifications on Year 3 National NAPLAN Cognitive Tests*, Melbourne Institute: Applied Economic & Social Research, Melbourne.