

# Evaluating the Impact of Nursery Attendance on Children's Outcomes

## Final Report

Jo Blanden, Kirstine Hansen, Sandra McNally



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## 1. The aims of the research project

The aim of this research project is to uncover the impact of Early Childhood Education and Care (ECEC) on children's outcomes in the UK. This question is addressed in the context of dramatic increases in public spending in this area from the late 1990s; most particularly the introduction of the free entitlement to part-time early education from age 3; hereafter the "free entitlement". The project has two arms; the assessment of the impact of different quantities of ECEC and the investigation of the impact of differences in the quality of ECEC. In both cases the outcome of interest is children's educational attainment in primary school.

In order to make a compelling case that we are measuring the causal impact of the quantity of ECEC on children's later educational outcomes we seek to exploit variations in access to nursery that occurred as a consequence of Government provision of the free entitlement. We have administrative data on outcomes and are able to match this with information on access to the free entitlement. Blanden et al. (2016) makes use of variation in access to the free entitlement generated by variations in the speed of the roll-out of this policy across different areas in England. Blanden et al. (2017a) exploits variation in access to the free entitlement generated by age-based eligibility rules, again focusing on English data.<sup>1, 2</sup>

We also wish to understand the association between children's outcomes and the characteristics of the provision they attend. We do this by matching data on children's educational achievement with information on the ECEC setting where the child receives the free entitlement in the year before (s)he goes to school. We are interested in examining childcare 'quality' in as far as we can measure it in the data, and this is proxied primarily by information on Ofsted ranking and staff qualifications. Results are reported in Blanden et al. (2017b). This study is not able to benefit from any quasi-experimental variation in the setting children attend, but our regression approaches are designed to reduce the influence of parental choice and move us as close as possible to picking up the influence of the setting.

We have developed the project beyond our initial proposal by combining our data on quality with the age discontinuity approach. Blanden et al. (2017a) tests if the benefits of accessing an additional term of the free entitlement vary according to the characteristics of

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<sup>1</sup> Although we considered exploiting variation in access to subsidised nursery care generated by eligibility for the childcare tax credit, eligibility to tax credits is income based and therefore can be potentially manipulated by families. We therefore decided not to pursue this avenue for analysis.

<sup>2</sup> We focus on England as education is one of the devolved responsibilities of the home nations of the United Kingdom. While similar policies exist in Wales and Scotland, differences in the detail of the policies and the availability of data mean we focus on England only.

the settings that it is received in. In this way we are able to explore the interaction of the quantity and quality of ECEC for children's outcomes.

All three elements of the project are focused on children's receipt of or eligibility for the free entitlement. Taken as a whole, the project delivers valuable new evidence on the effectiveness of the free entitlement. Given that the Government spent around £2billion a year on the free 15 hours entitlement for three and four year olds over the period we examine (Department for Education, 2013) and have very recently increased this provision to 30 hours for working parents, this focus is policy-relevant and timely.

## **2. Policy Details**

In 1998 the Labour government announced that it would introduce an entitlement to free part-time early education for all 3 and 4 year olds in England. This followed a similar policy announced by the Conservative government in 1996 for all 4 year olds. The policy became effectively universal across England for 4 year olds by 2000 (helped by a shift towards an earlier school starting age), but expanded more slowly for 3 year olds, becoming effectively universal across England by 2005. The devolved nations have similar policies, but our project examines only the policy regime in place in England.

The policy did not involve central or local government increasing its own provision of early education places to any significant extent; instead, it made use of the considerable private market for childcare and early education that has grown up over past decades. As a result, the free entitlement can be taken up at a local authority nursery school, a nursery class in a state school (known collectively as maintained settings), or at a private, voluntary or independent nursery or preschool (known collectively as PVI), or, very rarely, with a childminder<sup>3</sup>. Half of children take up their place in the public sector and half take up their place in a PVI setting (Blanden et al. 2017b). There is variation in the qualification levels of staff across the two sectors with all maintained nurseries employing a qualified teacher (or QTS for Qualified Teacher Status) while less than a third of PVI settings have a QTS or staff-member educated to graduate level in early years education (Blanden et al. 2017b). There is also other important variation within the PVI sector, with some children attending private day nurseries for long hours while their parents work and other families opting for short-hours term-time only provision through pre-schools.

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<sup>3</sup> We do include childminders in our data when they are delivering the free entitlement, but they do so in such small numbers that we do not believe they are influencing our conclusions. For example in the Early Years Census 2007 there are 100 providers who state they are part of childminding network of a total of 20,000.

The entitlement was initially for 2.5 hours a day (12.5 hours a week) for 33 weeks a year, but it was expanded to cover 15 hours a week (which can be taken flexibly over fewer days) for 38 weeks a year, our research primarily focuses on the 15 hours. From September 2013, the free entitlement has also covered 2 year olds from low-income families. Provision for 3 year olds was then expanded in September 2017 to 30 hours for children with working parents. The impact of the latter expansions are not covered by this research project.

Children are eligible to receive the free entitlement from the term after they turn three. Children born between 1<sup>st</sup> September and 31<sup>st</sup> December are eligible for a free place in the Spring term, after the Christmas holidays, those born between 1<sup>st</sup> January and 31<sup>st</sup> March are eligible for a free place in the Summer term, after the Easter holidays and those born between 1<sup>st</sup> April and 31<sup>st</sup> August are eligible for a free place in the new academic year starting in September. This means that children born just a few days apart are entitled to different amounts of free early education (around 3 and a half months, or a term) while starting school at the same time and within the same school-cohort.

### **3. Methodology**

#### *Exploiting the roll-out of the free entitlement*

When the free entitlement was being introduced in the early 2000s, some local authorities saw the availability of free places for 3 year olds increase considerably. However, other local authorities were already offering a large number of free public early education places, and therefore saw additional places rise by much less. In addition, there was variation in the timing of the build-up among those areas which funded new places: for example, although two thirds of all 3 year olds were accessing free places in 2002, in some local authorities (e.g. Bath, Kent and East Sussex) less than 30 percent of children were receiving them.

By comparing areas that saw a large increase in free places to those that did not, and exploiting the timing of the availability in each area we were able to assess how the increased availability of free early-education affected children. If the free entitlement has an impact on children's development, we would expect places to be associated with educational outcomes some time later. This research looked at children's performance in the Foundation Stage Profile (FSP) at age 5 and their Key Stage 1 and 2 results at ages 7 and 11 respectively using

data from the National Pupil Database (NPD) for children who join Reception classes in academic years 2002/3 to 2007/8.<sup>4</sup>

For the research design to work, it is essential to separate the impact of the change in free places from other factors which change at the local area level. To do this, we estimated a detailed econometric model which takes account of the fact that different local authorities might have experienced different changes in economic conditions or might have benefited differentially from other early years policies, such as the availability of Sure Start Centres. We also check if the timing of the expansion of free places is correlated with existing differences in trends in children's development. Allowing for this unlikely possibility does not change our results.

### *Exploring matched data on quality*

As one of the conditions for receiving Government funding, PVI providers that deliver the free entitlement are required to complete the Early Years Census at the turn of each year. This includes information on all the children in attendance and a reference number that can be matched with their later record in the NPD. It also includes setting-level data on the type of provision, number of staff and children and limited information on the qualifications of staff members. Our main focus is on the importance of having a staff member present who is a qualified teacher (QTS) or has earned Early Years Professional Status (EYP); around a third of children in PVI settings have a staff member in their setting with one of these qualifications.<sup>5</sup> Children who attend settings in the maintained sector can be found in the NPD in the year before they start school, although specific information on these nursery settings is very sparse so most of our analysis is restricted to differences in quality measures among PVI settings.

We are able to match information on the setting with the child's school record including information on the school attended and their performance in the FSP and Key Stage 1. We do this for 1.6 million children born between September 2003 and August 2006. We are able to complement the information from the Early Years Census on PVI settings with

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<sup>4</sup> The Foundation Stage Profile is completed by teachers on the basis of their assessment on the students' progress. Key Stage 1 is similar but is also informed by externally-set tests which are internally marked in schools. In both cases schools' assessments are moderated. Key Stage 2 assessments are entirely based on tests that are externally set and moderated.

<sup>5</sup> In terms of assessing the impact of staff qualifications on children's outcomes it is important to know if staff members have contact with children, and for what proportion of the time children spent in the setting. We do not have detailed information on this, but settings are asked specifically about staff members working with 3 and 4 year olds and we focus on this variable.

information on Ofsted ratings, the UK Office for Standards in Education who inspect settings once every four years. In this period settings were graded as ‘Outstanding’, ‘Good’ ‘Satisfactory’ or ‘Inadequate’. We have data on all assessments made for Early Years settings from 2005-2011. We match the child and their setting to the rating that is closest in time to when we observe them in the setting, and are able to match 80 percent of children with a rating, with 60 percent of the inspections made within two years of our observation point, the year before the child starts school.

The measures of quality that we have are very important in policy terms, as Government has previously targeted both staff qualifications and Ofsted scores for improvement. However, they do have limitations in their ability to capture “process quality” e.g. the nature of the activities and relationships that children engage in in their settings. Although there is an association between observed quality and both Ofsted rating and staff qualifications, it is not particularly strong e.g. those settings graded as ‘Inadequate’ do not always have the lowest quality ratings (Mathers et al., 2012); there is a moderate correlation between process quality and average staff qualifications ( Mathers et al., 2007). We also look at differences in outcomes between different nurseries, and consider this an alternative measure of the ‘quality’ of the setting.

Our research relies on observing children in the settings chosen by their parents. If children are selected into settings non-randomly, then regression analysis may confuse the impact of the characteristics of the settings they attend with the impact of the unobserved characteristics of children. We adopt several strategies to overcome this problem, although we may not be able to eliminate it completely. Most obviously, we hold constant the characteristics of the children in terms of their gender, month of birth, area of residence, free school meal status, language and ethnicity, but this may not go far enough. By controlling for the infant/primary school that children subsequently attend we compare children who are in the same school class but who attended nurseries of different quality. We also control for the average characteristics of the other children who attend the same childcare setting, this is a more discriminating indicator of the way that children sort into the setting. We can never be entirely confident that we have removed all selection bias in these results, and bias will remain if Ofsted results and staff qualifications are different for children with different academic potential. However, we provide evidence that Ofsted results and staff qualifications are only weakly related to socio-economic background. It therefore seems unlikely that they are strongly related academic ability.

*Making use of the discontinuity in eligibility to the free-entitlement by age*

As already discussed, children who are born between 1<sup>st</sup> September and 31<sup>st</sup> December receive five terms of free ECEC before they start school, children born between 1<sup>st</sup> January and 31<sup>st</sup> March receive four terms and those born between 1<sup>st</sup> April and 31<sup>st</sup> August receive three terms. Our analysis takes a Regression Discontinuity approach which makes use of this arbitrary entitlement rule that generates a sharp difference in entitlement for children only a few days apart in age.

To pick up the effect of the additional term of free entitlement we compare only those children who are born within 4 weeks of either the December or March cut-off.<sup>6</sup> Within these samples the children who are eligible will be older than the others at the time of their FSP assessment so we take care to control for differences in age, even within these narrow windows. We drop children who go on to attend schools that encourage younger children to start later so we do not confound the two effects (but this is only 4 percent of pupils). Studying children who started school in academic years 2008/9 to 2011/12 gives us a sample of more than 600,000 children born in 16 weeks of the year.

For the regression discontinuity design to be valid it is important to show that parents do not manipulate their child's day of birth to guarantee eligibility. If they do then eligibility might be correlated with parental motivation and therefore outcomes, and it would not be possible to discover the causal effect of eligibility. This can be tested by studying the distribution of dates of birth around the cut-offs. We find no irregularities. We do however find that children who speak English as an Additional Language or are in some non-White ethnic groups are more likely to have their date of birth recorded as 1<sup>st</sup> January.<sup>7</sup> We therefore drop children born on this day, and also those born on 1<sup>st</sup> April so that the two cut-offs are treated symmetrically.

It is important to consider whether we would expect to find an impact on outcomes of the entitlement to an additional term of free ECEC. This will partly depend upon whether families react to the entitlement by enrolling their child in formal childcare. To assess this we study evidence on patterns of attendance by age from the Family Resources Survey. We use the years 2005-06 to 2012-13 and select children living in England.

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<sup>6</sup> We do not consider children born around the 31<sup>st</sup> August cut-off as this also determines when they start school

<sup>7</sup> This anomaly has been noted elsewhere, see The Daily Telegraph "Thousands of foreigners given New Years' Day as date of birth" 29<sup>th</sup> January 2009.



#### **4. Findings**

*Although the free entitlement does lead to an increase in ECEC participation, the policy primarily supports parents in meeting the childcare costs they would face anyway.*

- Between 1999 and 2007, data from the Department for Education tells us that the percentage of three year olds in England receiving a free early education place rose by about 50 percentage points – from 37 percent to 88 percent. But the number of children receiving any kind of formal early education increased by much less; from 82 percent in 2000 to 96 percent in 2007. We also conduct an area level analysis relating places taken up to the number of free places available from 2002-2007, this accounts for both time trends in take up and differences across areas. It reveals that for every 4 children given a free place, one child began to use early education; for the other three children, the policy effectively gave parents a discount on the ECEC they would have paid to use without the policy.
- Analysis of the Family Resources Survey from 2005-2013 indicates that children are 10-12 percentage points more likely to be attending eligible childcare in the terms they are eligible for a free place than they were prior to entitlement. In addition, there is strong evidence of an anticipation effect amongst the autumn-born children: that is, their childcare use rises noticeably (by 6 percentage points) in the term that begins just before their 3<sup>rd</sup> birthday.
- There is evidence from both of these data sources that the impact of the free entitlement on enrolment is stronger among children from less advantaged families. For example, the strongest effect in the Family Resources Survey is found among those with parents with only compulsory education who increase their participation by around 20 percentage points when they become eligible.

*The impact of the roll-out on educational attainment was small and not long-lasting*

- Overall the increase in free places improved the outcomes of English children at age five by less than two percentage points on average. In levels, the policy as a whole shifts the average from a score of 87.5 on the Foundation Stage Profile (FSP) to a score of 89.2. The Foundation Stage Profile has a maximum value of 117 and allocates up to 9 points for each of 13 areas of learning. We test for differences across the scales, and do not find substantially stronger results across any of these. In particular there is no

evidence that effects are either larger or smaller for ‘personal, social and emotional’ development, an area of particular interest in other studies.

- In an attempt to further understand these results we compare estimates across different types of Local Authorities and find that results are stronger in areas where the relationship between free places and places taken up is stronger. We therefore assume that all the benefits of the policy were felt by children who only took up a place because it was free. In this case the introduction of the policy meant that children who would otherwise have had no pre-school experience achieved an additional 6 points in the FSP.
- Although there is modest evidence that the roll-out of the policy had a greater impact on outcomes at age 5 for children in receipt of Free School Meals, those living in poorer areas and those learning English as a second language, there is no evidence that the policy helped disadvantaged children to catch up in the longer term. Indeed, there is no evidence of any educational benefits of the policy at the ages of seven or eleven. Of course, we cannot rule out the possibility that the policy improved outcomes that are not measured (such as wellbeing). Furthermore, some policies can have effects on longer-term non-cognitive outcomes even though they do not have a lasting effect on cognitive outcomes (e.g. see Chetty et al. 2011).

*There is a weak relationship between nursery characteristics and outcomes.*

- Children who attended PVI settings where there is a QTS/EYP have a Foundation Stage Profile score of one third of a point higher, compared to those in PVI settings that do not; where the total number of points available is 117.
- Attending a setting rated ‘Outstanding’ rather than ‘Good’ is associated with moving up less than one point in the FSP overall (i.e. less than one level on just one of the 13 scales that make up the Foundation Stage of primary education at age 5).
- However, there is evidence of substantial unexplainable differences in outcomes between nurseries when we consider the overall impact of settings (in the context of a methodology that includes setting fixed effects). Subject to us having appropriately accounted for selection effects, this indicates that there may be differences in quality between settings, just not in a way that is predictable by staff qualifications or Ofsted ratings. This would be consistent with the literature on teacher quality which shows that

teacher quality has an impact on student outcomes, but not through most measurable characteristics such as their qualifications (Hanushek, 2011)<sup>8</sup>.

*There is no benefit from an additional term of eligibility for the free entitlement*

- Eligibility for an additional term of free part-time early education results in a zero or very small overall effect on educational achievement at age 5, depending on the specification used.
- There is no difference in the results between advantaged and disadvantaged groups.
- There is limited evidence that there is any benefit from an additional free term if children attend any particular type of setting; we tested maintained settings; pre-schools; high outcome settings; settings with workers qualified to degree level and settings rated as Outstanding by Ofsted.

## **5. Implications and Recommendations**

Conceptually it makes sense that early interventions should improve children's outcomes; the earlier investments are made, the longer their benefits will be felt. In addition, evidence from neuroscience shows that the brain is undergoing its most critical period of development in early childhood (Phillips et al., 2000). Finally, economic models have demonstrated that early skills help to develop those that come after (Cunha et al., 2010), making them even more important. It is undoubtedly true that there is potential for ECEC to be beneficial for children's development, and this has been confirmed in randomised assignment trials of high quality targeted programmes (Barnett, 1995, Heckman et al. 2013).

Evidence from universal programmes has been more mixed and research for England is not alone in finding zero or small benefits from universal ECEC (Baker et al., 2008, Datta Gupta and Simonsen, 2010). Converting potential benefits into reality is not an easy task. There is consensus that 'high quality' programmes are required for child development impacts to be delivered and we can speculate that the free entitlement may not be consistently of high enough quality to have detectable and long-lasting benefits. This idea is supported by research on infant schools that shows that an additional term spent in this environment does benefit children's FSP scores (Cornelissen et al., 2013). We infer from this that an extra term

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<sup>8</sup> Araujo et al. (2016) provide an interesting discussion of the impact of teacher quality on young children in Ecuador. Children are randomly assigned to kindergarten classes, and the quality of teaching is assessed. Higher quality teaching does lead to better outcomes for children, but it cannot be predicted by teacher IQ, personality or contract status.

*could* make a difference, but that there is a difference between what is offered in nursery settings compared with infant schools.

In this case, policy makers and commentators are faced with some difficult questions. First we must ask what the free entitlement is *for*. In 2002 the then Labour Government discussed the ‘double-dividend’ of the policy in terms of promoting both school-readiness and maternal employment (Strategy Unit, 2002, p.29). The initial set-up of the policy as a short session five days a week was clearly designed with child development in mind, but subsequent changes to allow the entitlement to be taken more flexibly indicated a shift in policy focus towards maternal employment. This has continued in the thinking behind the extension to 30 hours. Brewer et al. (2016) investigate the impact of the free entitlement for maternal employment, and find that it has little or no effect.<sup>9</sup> If the free entitlement does not improve children’s outcomes or raise maternal employment then its main impact is to help parents with the costs of childcare. This is beneficial for many families, but it is a transfer rather than an investment and will have no additional benefits unless these are captured by outcomes that are not measured in available data (such as wellbeing and/or non-cognitive abilities).

From a child development point of view, we might suggest that policy efforts should be focused on improving quality (particularly in the poorest areas) instead of expanding the offer to 30 hours. However, our work has provided no clear evidence on how quality could be achieved in the English context, despite the finding that there are differences between nurseries.<sup>10</sup> Our analysis focused on graduate workers and Ofsted inspection regimes, as these have been a focus of policy to improve quality and as a consequence information on them is available. It may be that that these levers are insufficient and that the focus on these aspects is in part to blame for the limited benefits of the policy overall. It could be that more detailed data would reveal a factor that clearly leads to improved outcomes for children. For example, the information we have on the qualifications of staff in settings is very limited, and other researchers have expressed concerns at the ability of Ofsted measures to appropriately capture process quality (Mathers et al., 2012). In addition, our analysis focuses on comparing PVI settings, we can say little about differences between maintained and PVI settings or within the maintained sector.

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<sup>9</sup> This study also assesses the employment effects of the transition from 15 to 30 hours when children start infant schools. Effects of the additional hours are larger, but not transformative, with implications for the likely effect of the shift to a 30 hour free entitlement.

<sup>10</sup> Further work is needed to assess the extent to which these differences are a result of parental choice sorting different children into different settings.

Our work highlights many unanswered research questions. We wish to know why the free entitlement does not deliver benefits when time spent in more formal infant schools does. This may require further study of what quality looks like and how it can be achieved. As part of the Department for Education-funded SEED project (Survey of Early Education and Development) data is being gathered on the quality of settings based on the activities and interactions that go on day-to-day. It will, however, take some further work to convert this useful descriptive exercise into a prescription for improving quality. Investment in Randomised Control Trials could have enormous benefits here<sup>11</sup> as they could provide information on ways to change nursery practice that would be effective in improving outcomes. An investigation of the childcare workforce might also prove fruitful; they are historically the lowest paid group in the education system and it could be that attracting better quality workers through better working conditions would be beneficial; we don't know. In addition, we should find out more about the childcare market, as the diverse private market and complex funding model has led to considerable complexity in the sector. All of these areas are ripe for further research.

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<sup>11</sup> Nuffield Foundation has been working with the Education Endowment Foundation to encourage the development of more projects evaluating the impact of early years' programmes. Details can be found at <http://www.nuffieldfoundation.org/news/new-partnership-education-endowment-foundation-build-evidence-base-around-early-years-intervent>.

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