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AN INITIAL ASSESSMENT OF THE 2-YEAR-OLD FREE CHILDCARE ENTITLEMENT: DRIVERS OF TAKE-UP AND IMPACT ON EARLY YEARS OUTCOMES

AUGUST 2018

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Summary

This report looks at the early signs of impact that the introduction of the 2-year-old entitlement has had. The expansion of government-funded childcare to disadvantaged 2-year-olds was specifically targeted at reducing the early years attainment gap and is intended to better prepare disadvantaged children for the start of formal schooling. It is important to understand the impact the policy is having and how best to support take-up in order to maximise its potential to improve child outcomes.

Context

From September 2013, the 2-year-old entitlement for free early education was introduced in England. It provides 15 hours of free childcare per week for 2-year-olds from disadvantaged households. This significantly expanded the pre-existing provision of publicly funded childcare for disadvantaged households with young children. Take-up was initially low but by January 2018 had increased to around 72% nationally. However, there remains considerable local variation, with the Department for Education (DfE) estimating that take-up across local authorities ranges from near-universal to a low of around 47%.¹

DfE has identified understanding the drivers of low childcare take-up among disadvantaged children and providing support to communities in which take-up is low as one of the potential mechanisms for reducing the socioeconomic gradient in early years educational outcomes.

What contribution does this report make?

In this report we set out to improve understanding of both what explains local variation in take-up of childcare and the impact of take-up on the government's main measures of pupil progress in the early years. Specifically:

- Using DfE pupil-level data, we explore the drivers of take-up in the first two years following the introduction of the 2-year-old entitlement. We consider pupils eligible for free school meals (FSM) at the beginning of Reception and explore the factors associated with whether or not they attended government-funded childcare aged 2 in 2013/14 and 2014/15.
- We consider the recent trends in the early years progress measures at the end of Reception, specifically for FSM pupils. We test whether there has been any association between the expansion of government-funded childcare among disadvantaged 2-year-olds and improvements in early years attainment.

Findings

On the drivers of take-up, we found that:

- Take-up of the 2-year-old offer among FSM children increased significantly over the first two years following introduction, but there remains considerable variation, with take-up particularly low in major metropolitan areas.
- Although the cultural and linguistic characteristics of families in these areas appear to play a role in explaining low take-up, these do not fully explain

1 Excluding the City of London and the Isles of Scilly.

the difference. Among White British pupils in London, take-up remains comparatively low.

- Access to places and differences in the type of providers offering funded places to 2-year-olds also appears to be an important factor, potentially limiting take-up.

On the impact of early years educational outcomes, we found that:

- The Early Years Foundation Stage Profile (EYFSP) is an insensitive measure to use in assessing the effectiveness of a policy such as this, making it challenging to detect any impact the offer may be having. In particular, changes to the assessment since 2011/12 mean that nearly 30% of FSM children now receive the same overall attainment score. Nevertheless, it is the government's national measure of child progress in the early years.
- Over the past five years, the performance of FSM children at the end of Reception has been improving and the gap with non-FSM children has closed by a small amount. If the gap were to continue to close at the same rate it has over the past five years, it would be over 40 years before the same proportion of FSM pupils achieved a good level of development as non-FSM pupils.
- The rate at which the gap closed did not accelerate notably in 2015/16 and 2016/17, the first years in which the effects from the 2-year-old offer would be seen. At a national level, there is little evidence to suggest the introduction of the 2-year-old entitlement has been associated with a substantial increase in the early years educational outcomes of FSM children.
- Testing the impact more formally, we find mixed evidence of positive effects from the expansion of provision of childcare for 2-year-olds on FSM pupils' EYFSP results:
 - In the first year we find no relationship between the number of months of entitlement children had for the expanded offer and pupil-level differences in attainment.
 - However, when looking at changes in attainment at the local authority level, we do detect a small positive relationship between increases in take-up over the first two years of the entitlement and increases in attainment of FSM children.

Recommendations

We have identified a number of potential barriers that are worth exploring further to help maximise take-up, specifically:

- Younger children (that is, those who have only recently turned 2 at the time of the census) are shown to be significantly less likely to have taken up the entitlement. Understanding the barriers to younger children attending – whether this is linked to parental preferences or difficulties faced by providers in accepting children part-way through the academic year – could help ensure children benefit from the full entitlement.
- There are cultural and potentially language barriers to attending childcare, with children less likely to attend if they are from non-White British² backgrounds and where English is a second language spoken at home. Understanding how to reach out to these communities and supporting them in attending childcare could significantly boost take-up.

2 That is, all children whose ethnicity is reported as any category other than White British in the school census, excluding those children where it is unreported.

- In relation to factors outside the home, maintained providers appear less likely to offer 2-year-old places. Looking at measures to get maintained providers to expand places to 2-year-olds or to get new private and voluntary providers to open in areas with high levels of maintained provision, should be considered.

On educational outcomes, our analysis indicates that the 2-year-old offer does have the potential to make some impact on the gap between FSM pupils' EYFSP performance at the end of Reception and their more advantaged peers, and that take-up of the offer is important. However, given the relatively small impacts seen so far, it is important DfE keeps the policy under review to ensure that it is effective in pursuing its overall aim of reducing the early years attainment gap for disadvantaged children.

Foreword

It is well known that large gaps in educational performance between children born into economic disadvantage and their better-off peers open up early and widen throughout school years. Successive governments have tried to address this in various ways. High-quality childcare is an important potential route to narrowing this gap, and there is good evidence to suggest it can improve long-term outcomes for disadvantaged children.

The current policy of providing 15 hours of free early years education to all 2-year-olds in the bottom 40% of the income distribution (the 2-year-old offer) is, on the face of it, a sensible approach. The offer aims to improve disadvantaged children's social and cognitive outcomes so that by the age of 5 they are as ready as their more advantaged peers to start and fully benefit from school.

The work of EIF is focused on ensuring that effective early intervention is available for all children and young people at risk of poor outcomes. Government funding of early years education and childcare support, which is projected to reach around £6 billion a year by 2019/20, is one of the biggest single investments in early intervention that the current government makes. Five years on from the start of this policy, it is important that we take stock of what the available data can tell us about the impact of the first years of the policy, and consider if anything can yet be drawn about how the policy might evolve.

Our analysis shows that, to date, the introduction of the 2-year-old offer has not been associated with a step-change in the attainment of disadvantaged pupils at the end of Reception year. While the size of the attainment gap between pupils who are eligible for free school meals (FSM) and non-FSM pupils has fallen over the past few years, the rate at which this gap closed in 2015/16 and 2016/17 (the first years in which the effects from the 2-year-old offer would be seen) did not accelerate notably.

However, there is also considerable local area variation in take-up of the offer by eligible families. Age of child, ethnicity, language spoken at home and the availability of places all play a role in how likely families are to take advantage of free provision. When we tested the relationship between changes in take-up and local authority-level changes in disadvantaged pupils' attainment, we do find a modest positive association. The size of this association may be disappointing, however, given ambitions to reduce the attainment gap.

While analysis of administrative datasets such as this does not allow us to identify what might sit behind these results, it should give policymakers some cause for reflection. The 2-year-old offer is frequently presented as a central mechanism through which the current government is intervening early to support children to overcome some of the effects of economic disadvantage, and as a way to increase social mobility. It is vital that the impact of the 2-year-old offer for disadvantaged children is closely monitored going forward. If, over the next few years, we do not see a significant narrowing of the early years attainment gap between disadvantaged children and their peers, then there is an urgent need to examine if this policy needs to be adapted in order to maximise the benefits of this considerable investment.

Donna Molloy
August 2018

1. Introduction

1.1 Context

The Early Intervention Foundation (EIF) is part of the government's 'What Works' network. Our mission at the EIF is to ensure that effective early intervention is available and is used to improve the lives of children at risk of poor outcomes. This report is part of a programme of activity looking at the impact of childcare and its potential to improve outcomes for children, particularly for children at risk of falling behind educationally.

There is compelling evidence that attending early years childcare can have significant positive impacts on a range of outcomes, including cognitive, behavioural, social and physical development (Melhuish et al 2015). There is some evidence that, when of high quality, childcare can be particularly effective at improving outcomes for children from disadvantaged households (Sylva et al 2014).

Government funding of childcare may support a number of objectives, including supporting families' incomes and participation in the labour market. However, the expansion of government-funded childcare for 2-year-olds was particularly motivated by a desire to improve early years educational outcomes and to support school readiness among disadvantaged children (DfE 2014). The Department for Education's (DfE) plan to improve social mobility *Unlocking Talent, Fulfilling Potential* sets out the government's commitment to reducing the socioeconomic gradient in the early years by improving both the quality and take-up of early years education provision (DfE 2017a).

1.2 What is the 2-year-old entitlement?

The government-funded 2-year-old entitlement was introduced from September 2013. It provides 15 hours of funded childcare during the school term to children from disadvantaged backgrounds. It complements the 15 hours of childcare available to all children in the term after they turn 3. The criteria for the 2-year-old entitlement includes a non-economic component (reflecting factors such as whether children are looked after by the local authority, have a special educational needs (SEN) statement or have been adopted³) and an economic component reflecting household income.

In the first year, the economic criteria were the same as those used to decide FSM eligibility in schools: families had to be claiming either out-of-work benefits or in-work benefits (excluding working tax credits (WTC)) and earning less than £16,190 gross taxable income. From September 2014 the economic criteria were relaxed so that families claiming WTC and earning less than £16,190 could also benefit. In the first year, DfE estimates that the entitlement initially extended to around 20% of the poorest households, equivalent to around 130,000 children (DfE 2013). From the second year, the size of the eligible cohort is estimated to have doubled to capture 40% of poorest households.

Prior to the introduction of the 2-year-old entitlement, there was some central government funding available to provide places for 2-year-olds. From 2009, DfE distributed funding to cover around 20,000 places directly to local authorities,

3 For a full list of the current entitlement criteria see the DfE website <https://www.gov.uk/help-with-childcare-costs/free-childcare-2-year-olds>

sufficient for 10 hours of childcare a week (Gibb et al 2011). This wasn't an entitlement as such; local authorities had some discretion in how the funding was targeted and amounts were allocated by DfE on the basis of average deprivation rates in the local area. This funding was not ring-fenced, so it is not known the extent to which it reached children it was intended to support. The introduction of the national entitlement from 2013 therefore represented a significant expansion in both the hours of funded childcare and the numbers of children who could potentially benefit.

1.3 How has take-up varied?

DfE began reporting estimated take-up of the 2-year-old entitlement from 2014/15 onwards at the local authority level (DfE 2018). No estimates were published for the first year, 2013/14. Estimates of take-up from 2014/15 onwards are not disaggregated by reason for entitlement.⁴ DfE figures show the overall take-up rate was 58% nationally, as at January 2015 – varying from 26% in Tower Hamlets and 85% in Richmond. By January 2018, take-up had increased to 72% nationally, however locally there remained considerable variation: take-up remained lowest⁵ in Tower Hamlets (at 47%), but had increased to at least 100% in 10 local authorities.

By comparison, take-up of the universal 15 hours of childcare aged 3 is estimated at around 92% nationally, with only three local authorities in which take-up fell below 70% in 2018. In this context therefore it is clearly important to understand why take-up of childcare at age 2 lags behind that at age 3, and the particular barriers faced by disadvantaged households.

1.4 What contribution does this report make?

We set out to improve understanding of both what explains local variation in take-up of childcare and its potential impact on the government's main measures of pupil progress in the early years. Specifically:

- Using DfE pupil-level data we explore the drivers of take-up in the first two cohorts of eligible children. We look at pupils eligible for free school meals (FSM) at the beginning of Reception and explore the factors associated with whether or not children attended government-funded childcare aged 2 in 2013/14 and 2014/15.
- We consider the recent trends in the early years progress measures at the end of Reception, specifically for FSM pupils. We test whether there has been any association between expansion of childcare among disadvantaged 2-year-olds and improvements in attainment measured by the Early Years Foundation Stage Profile (EYFSP).

Each of these issues is addressed in turn in the remainder of the report.

4 DfE estimates are derived by dividing the total number of children known to have taken up a funded place by figures supplied by the Department for Work and Pensions (DWP) for the number of children believed to have met the benefit and tax credit eligibility criteria for individual local authorities.

5 Excluding the City of London and the Isles of Scilly.

2. Drivers of take-up

In this section we look at the factors that most influence take-up of the 2-year-old free entitlement, in particular, factors associated with take-up among children that likely met the FSM criteria for entitlement. We begin with a brief overview of some of the existing literature in this area. This is followed by an outline of the methodology used to identify eligible children, and a descriptive analysis of some of the main relationships between child and local area characteristics and take-up. Finally, we use a regression-based approach to identify, in combination, which factors best predict children's attendance.

The main findings are:

- Take-up, as at 31 January, varies significantly by age, with the youngest children (that is, those that have just turned 2) less likely to attend than their older peers.
- Take-up is particularly low in London and Birmingham and surrounding metropolitan areas, although low take-up isn't confined solely to large urban areas. Once other factors are controlled for, take-up is lower in rural compared to urban communities.
- Demographic characteristics, such as ethnicity, explain a significant proportion of the variation in take-up. Take-up is lower for pupils from non-White British backgrounds and particularly low when English is an additional language spoken at home, suggesting cultural and linguistic differences could be a barrier to accessing childcare.
- However, pupil-level characteristics alone do not explain low take-up. The absolute supply of places for 2-year-olds may be a contributory factor. In particular, where the concentration of maintained providers (such as schools and nurseries) is high, take-up tends to be lower, implying not all types of providers have been able or willing to expand provision to younger children.

2.1 Literature summary

Compared to other issues related to childcare (such as impacts on attainment and maternal employment), there has been comparatively little recent research into the drivers of take-up, particularly among the youngest children. There are various sources that suggest take-up of formal childcare is generally lower among poorer households (Mathers et al 2007, Speight & Smith 2010) and that take-up of government-funded 3-year-old provision is lower in more economically deprived areas (NAO 2016); however, there has been little empirical work looking into the characteristics of children that do not attend, and other influencing factors.

Campbell et al (2018) considered the take-up of the 3-year-old free entitlement for one cohort of autumn-born 4-year-olds and how this varied by later FSM eligibility. Autumn-born children (children born September–December) are entitled to five terms worth of free childcare, after they turn 3 and before they enter Reception. Using National Pupil Database (NPD) data, they examined whether all autumn-born children that took up a place in January 2011 were also in attendance when they first became eligible in January 2010, and explored the main drivers of non-attendance. Their work helps to highlight the multiple factors potentially driving attendance.

In particular, they found:

- Take-up across all children was found to be relatively high, with around 80% attendance from the beginning of the entitlement.
- Take-up was lower for children who later went on to claim FSMs and particularly those that were persistently FSM eligible in future years.
- Take-up was lower among children from non-White British backgrounds and where English was not the primary language spoken at home.
- The likelihood of take-up in areas with high neighbourhood deprivation was lower; however, the gap between FSM and non-FSM attendance was reduced in areas with higher deprivation.
- The types of providers available locally was also found to be associated with variation in take-up. In particular, areas with higher maintained provision (that is, schools, maintained nurseries and children's centres) were associated with lower overall take-up in January. Areas with higher levels of voluntary sector provision had higher overall take-up and a smaller gap in take-up between FSM and non-FSM pupils.

In relation specifically to take-up of the 2-year-old entitlement, findings from the baseline survey for the Study of Early Education and Development (SEED)⁶ evaluation (Speight et al 2015) show that among the 20% most disadvantaged households, take-up of funded childcare was just below half (48%) for eligible children. Among this group, the incidence of families not using formal childcare was highest where mothers had no or low formal qualifications (48%) compared to mothers with GCSEs/A levels (39%) and having a degree or higher (36%). Families that were eligible for the 2-year-old entitlement and not using formal childcare were asked the main reason for taking up the offer. Among the 20% most disadvantaged families the most common reason stated was personal preference (50%) followed by cost (17%), concerns child were too young (11%), availability of places (12%) and because parents were not working (3%).

2.2 Approach to identifying take-up

Annex 1 contains a full description of the data sources and approach used to identify take-up. The DfE collects data annually on the children receiving a funded early years place. This includes children in privately, voluntarily and independently-run (PVI) settings (collected via the early years census) or in school and nursery-based provision (collected via the schools census). Combined, these datasets provide a once-yearly snapshot (as at 31 January) of the total number of 2-, 3- and 4-year-olds receiving government-funded childcare. While DfE census data provides detailed pupil-level information on children that took up a funded early years place, there is no information on the children that may have met the entitlement criteria but didn't attend. In order to estimate who could have taken up a place but didn't, we must model this using some other means.

The majority of all children that could have taken up free childcare aged 2 will be attending a maintained school in Reception two years later. Here, along with basic characteristics information (such as ethnicity, gender, date of birth and location),

6 The SEED evaluation is a new longitudinal study following around 5,600 children from across England through to the end of key stage 1. It will examine how childcare and early education impacts on child outcomes. The study is being carried out by NatCen Social Research, working with Frontier Economics, the University of Oxford and Action for Children, on behalf of the Department for Education.

information is also reported on children's FSM status.⁷ We use the complete list of pupils in Reception who were eligible for FSMs and match back to their childcare records to identify whether or not they took up a government-funded place in the preceding years. Later FSM eligibility is therefore used as proxy for whether families *could* have taken up a funded 2-year-old place and their childcare records used to identify whether they *did*.

There are a number of issues to be aware of when interpreting the findings:

- The analysis **only relates to children that likely met the FSM criteria for entitlement**. As previously discussed, from 2014/15 onwards eligibility expanded to reflect a wider group of children than captured solely by the FSM criteria. We have no means of identifying eligibility in this expanded group.
- The time lapse between children attending aged 2 and appearing in Reception where they may claim FSMs means some **families' economic circumstances may have changed**.
- Due to the time delay between children taking up a 2-year-old place and appearing aged 4 in Reception, we **can only consider the impact over the first two years of rollout, 2013/14 and 2014/15**. Later waves of data are not yet available.

On the first issue, raising the attainment of FSM children was a clear ambition of the policy, where FSM children meeting the FSM criteria represent roughly half the eligible cohort. While the findings may not be fully generalisable to the expanded cohort from 2014/15 onwards, this is still a highly relevant group to consider in isolation. On the second issue, despite the time lapse we believe this is the best approach available and likely to capture the majority of children that would have been eligible. Figure 2.1 demonstrates that our approach provides a good match to local area take-up estimated from other sources. On the third issue, take-up remains low in many areas of the countries and lags behind the universal offer at age 3.

The remainder of this section presents the findings from the analysis on take-up. Unless otherwise stated, all data and analysis herein are based on the authors' calculations.

2.3 Headline findings on take-up

Table 2.1 provides a summary of the estimated proportion of FSM pupils that benefited from a free 2-year-old childcare place. In the first year of implementation, around 41% of children who likely met the FSM criteria were taking up the offer (as at 31 January 2014). In the second year we only have data available for children born between January and August. Children born after then won't appear in Reception until the 2017/18 school census, which wasn't available. For children born between January to August take-up increased by around 12 percentage points in the second year compared to children born in the same period the year before. Although take-up increased significantly, around 40% of FSM children did not attend.

In order to sense-check our method, we compare our derived take-up figures with those published by DfE at the local authority level for 2014/15. As noted above, these estimates are not split by whether children met the FSM criteria (which extended to the lowest 20% of income households) or the expanded eligibility

⁷ Throughout this report we use the 'Ever6' definition of FSM eligibility, used to determine entitlement for the pupil premium. This essentially means we classify children as FSM eligible if they were identified as being in receipt of FSM in either of the October or January school censuses of their Reception year.

criteria (that captured around 40% of the most deprived households), meaning the two sets of estimates will not be fully comparable. Nonetheless, we should expect to see a strong relationship between the two figures.

TABLE 2.1: ESTIMATED TAKE-UP OF 2-YEAR-OLD OFFER, 2013/14–2014/15

Birth month	Total pupils*	Total FSM pupils	FSM pupils in childcare aged 2**	
			Number	Proportion
2013/14 2-year-old cohort				
Jan–Apr	211,393	32,712	15,820	48%
May–Aug	223,204	33,880	15,409	45%
Sep–Dec	223,195	33,159	9,805	30%
Overall	657,792	99,751	41,034	41%
2014/15 2-year-old cohort				
Jan–Apr	216,824	32,632	19,964	61%
May–Aug	221,439	32,731	18,813	57%
Sep–Dec	***	***	***	***
Overall	438,390	65,372	38,782	59%

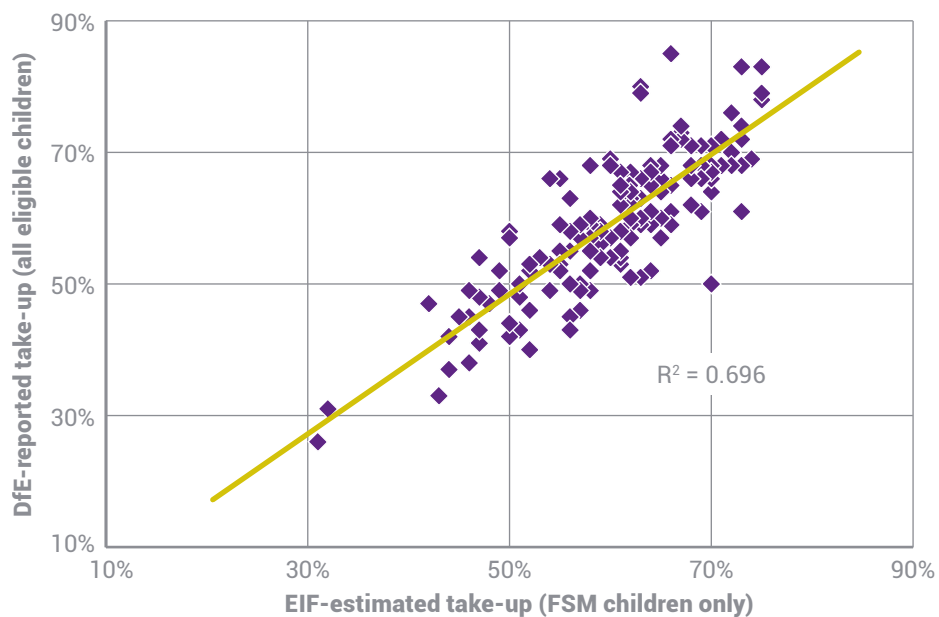
Notes:

* All children with a record of FSM status in Reception.

** Child found to be FSM eligible in Reception and found to be receiving government-funded childcare aged 2 in the early years or school census.

*** Too low to report.

FIGURE 2.1: COMPARISON BETWEEN DfE ESTIMATED TAKE-UP AND EIF-DERIVED ESTIMATES BY LOCAL AUTHORITY, 2014/15



Source: EIF

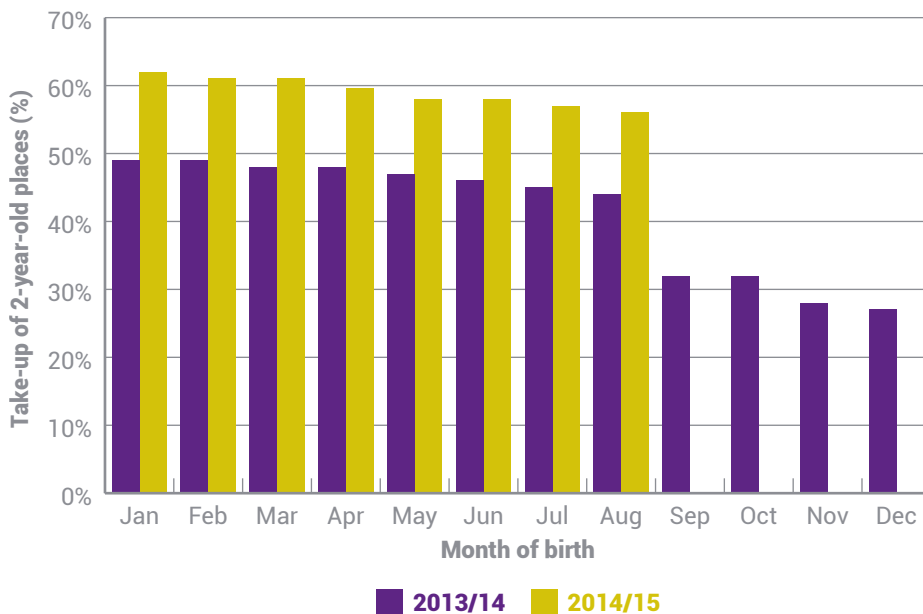
Note: Figures for the Isles of Scilly and City of London have been excluded due to the small number of children.

Figure 2.1 confirms there is a good fit between our modelled take-up rates at the local authority level and DfE’s reported take-up figures for 2014/15 (explaining around 70% of the variation between the two estimates). Due to the differences in methodology and eligibility criteria being modelled, we wouldn’t expect to see a perfect relationship. However, the fact there is such a strong relationship at the local authority level provides some comfort to the overall validity of our approach.

2.4 Take-up by month of birth

Table 2.1 above shows a declining relationship between month of birth and take-up. Figure 2.2 disaggregates this further, by showing take-up rates by individual month of birth. As previously noted, the early years census provides a once-yearly snapshot of children in government-funded childcare, as at 31 January. This means at the time of census children born in January were just on the cusp of turning 3, where children born in December would have only just turned 2. Figure 2.2 shows that it is the older children at each January snapshot that are most likely to attend. Based on the figures for 2013/14, take-up is particularly low for children who turned 2 after the beginning of the academic year (that is, those born from September to December), dropping 12 percentage points for children born in September compared to August. These children would not have been eligible at the start of the school term in September, but would have been eligible from January onwards.

FIGURE 2.2: FSM 2-YEAR-OLD TAKE-UP, BY COHORT AND MONTH OF BIRTH, 2013/14–2014/15



Source: EIF

As DfE only collects once-yearly snapshot data for take-up, we do not know whether children eligible but not attending at the time of the census took up childcare later in the year. Furthermore, we do not know why parents of younger children are less able or willing to find a place for their child. Nonetheless, in order to increase take-up nationally, it would be worth looking at methods to encourage parents of younger children to attend as soon as they are eligible.

The noticeable drop-off in take-up for children who turned 2 after the beginning of the academic year (that is, those born between September and December)

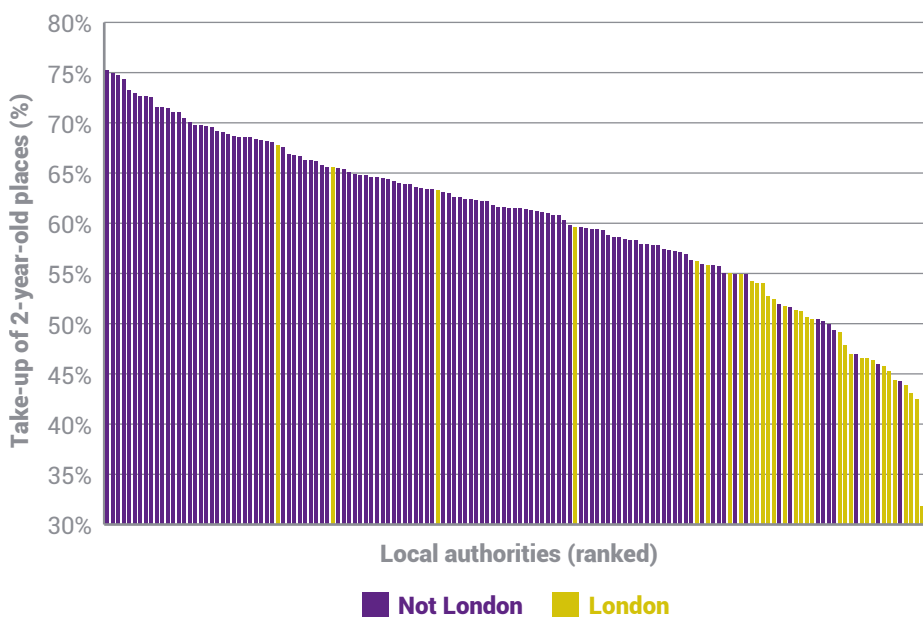
might imply settings are less able or willing to accept pupils part way through the academic year. Although our analysis doesn't provide evidence to support this hypothesis, it would be worth further exploration of low take-up specifically among this group, the extent it is found for later cohorts, and whether this relates to choices made by households or lack of flexibility or capacity at the provider level.

2.5 Geographic variation in take-up

There is considerable local-level variation in take-up of 2-year-old free childcare. Figure 2.3 (over) provides a heat-map of modelled FSM take-up by local authority for 2014/15. Take-up is shown to be particularly low in Inner London (at around 45%) and Outer London (at around 51%) compared to a regional high of 64% for the North West.

Figure 2.4 ranks modelled take-up rates in 2014/15 at the local authority level. Take-up varies from between 75% in Warrington to 31% in Tower Hamlets. In the bottom quartile, 26 out of 38 local authorities are in London. Of the non-London local authorities, this includes Birmingham (with 49% take-up) and its surrounding metropolitan area, including Sandwell (with 44% take-up), Dudley (with 46% take-up) and Wolverhampton (with 50% take-up). Although large metropolitan areas are overrepresented, this group also includes the East Riding of Yorkshire (55% take-up), a far more rural and dispersed geographic area. This implies low take-up isn't solely confined to urban areas. Indeed, Salford has the fifth-highest take-up, at 73% based on our estimates.

FIGURE 2.4: RANKED FSM 2-YEAR-OLD TAKE-UP BY LOCAL AUTHORITY, 2014/15

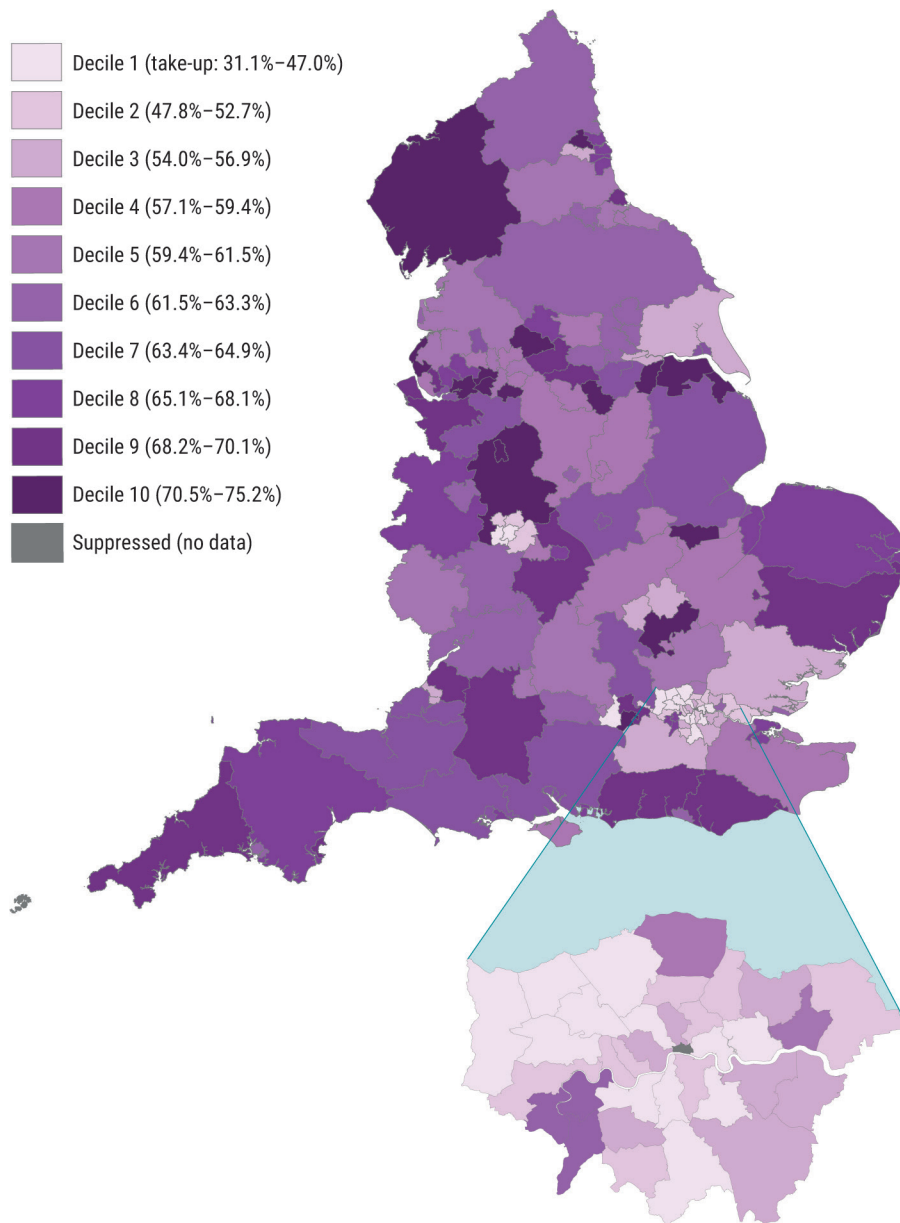


Source: EIF

Notes: Figures for the Isles of Scilly and City of London have been suppressed due to the small number of children.

The geographic analysis shows that while understanding the drivers that explain low take-up in London and the West Midlands is likely to be key in helping to identify factors to increase take-up nationally, there is likely to be no single, simple explanatory factor or solution.

FIGURE 2.3: FSM 2-YEAR-OLD TAKE-UP, 2014/15



Source: EIF

Notes: Estimates are based on take-up for children born between January–August 2012. Figures for the Isles of Scilly and City of London have been suppressed due to the small number of children.

2.6 Descriptive analysis

The following section provides descriptive analysis of a range of pupil-level and local area characteristics, that may explain the local variations in take-up. The main factors considered include:

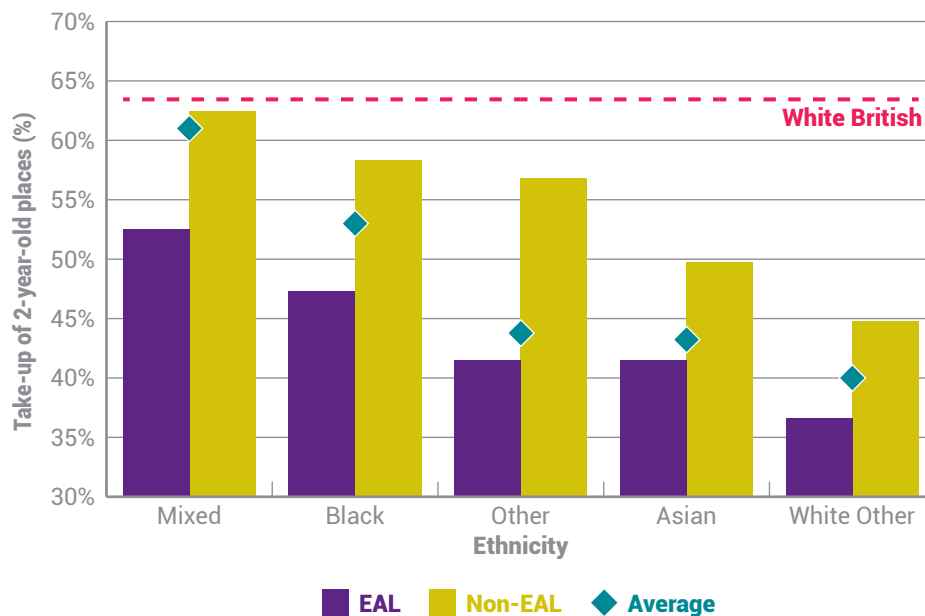
- pupil demographic characteristics
- special educational needs (SEN) status
- local area economic factors
- access to places
- local provider mix.

Throughout this section we limit our analysis to take-up of government-funded childcare at age 2 for children in the second year of implementation (2014/15) born between January and August. Although we do not have a full year's worth of data (that is, children born September–December are excluded) it seems appropriate to include data for the most recent cohort we can model. This will better reflect the current factors driving low take-up in some areas. Overall, we include data for around 65,000 children who could have potentially benefited from a funded place.

Demographic characteristics

Figure 2.5 compares modelled take-up of 2-year-old free childcare in 2014/15 by pupils' ethnicity and whether English is an additional language (EAL)⁸ (that is, whether the primary language children are exposed to at home is something other than English).

FIGURE 2.5: FSM 2-YEAR-OLD TAKE-UP BY ETHNICITY AND PRIMARY LANGUAGE SPOKEN AT HOME



Source: EIF

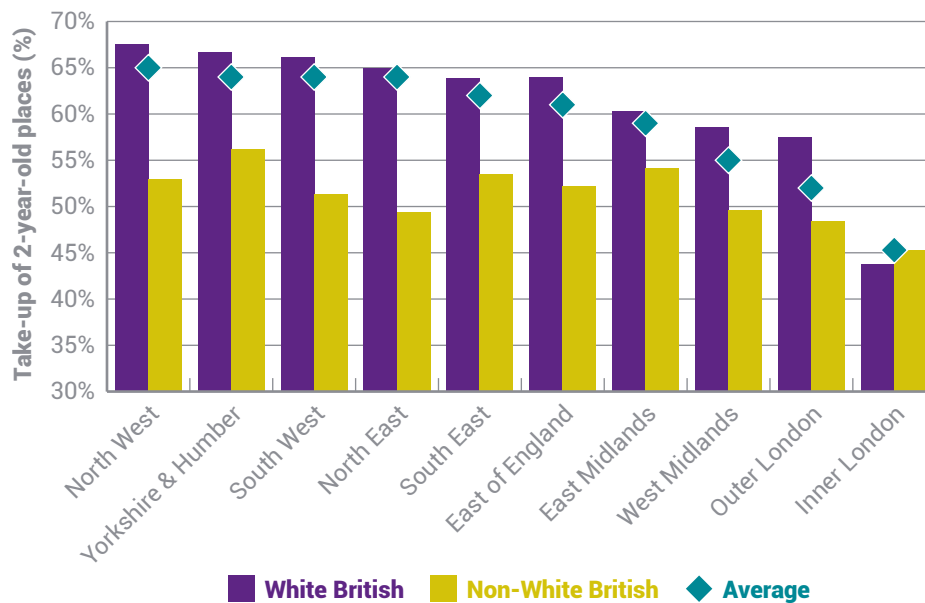
⁸ Pupils for whom the language to which they were exposed to during early development and continues to be used in the home or in the community is other than English, or not known but believed to be other than English.

The chart shows that take-up compared to White British pupils is lower across all ethnic groups, particularly among children from Asian backgrounds (lowest for children from Bangladeshi (30%) and Indian (45%) families) and White Other backgrounds (including children from Gypsy/Roma (34%) and Irish Traveller (38%) families. Within these groups, take-up is particularly low for children for whom English is not the primary language spoken at home.

Figure 2.5 masks the influence of other drivers that may vary systematically between different ethnic groups (such as location) and also independently influence take-up. We do not know whether it is cultural or linguistic barriers that suppresses take-up among certain groups or other factors, such as the availability of places locally, which are the true drivers.

Figure 2.6 shows take-up split by region and ethnicity. Take-up in all regions except Inner London is lower among non-White British children. However, when looking at the overall regional take-up rates, they are highly correlated with declines in take-up among White British children. This suggests that, while the higher concentration of non-White British families in London and the West Midlands compounds lower take-up rates in these regions, other factors are also working to inhibit take-up across these communities. Ethnicity alone therefore, does not explain low take-up across regions.

FIGURE 2.6: FSM 2-YEAR-OLD TAKE-UP BY REGION AND ETHNICITY



Source: EIF

Special educational needs (SEN)

Figure 2.7 shows the relationship between modelled take-up and pupils' recorded SEN status in Reception, by SEN type and region. SEN pupil take-up is shown to be higher than for non-SEN pupils. For SEN pupils with a statement, take-up is 9 percentage points higher than for non-SEN pupils; for SEN pupils without a statement,⁹ it is 4 percentage points higher.

Higher take-up among SEN children is consistent across all regions, with the gap between SEN and non-SEN (including children with and without a statement)

⁹ Special educational needs (SEN) refers to children who have learning problems or disabilities that make it harder for them to learn than other children of the same age. Children with needs that cannot be met by the school are provided with a statement, a formal document detailing the help that will be given.

greatest in the South West, where take-up for SEN children is 9 percentage points higher than for non-SEN children.

FIGURE 2.7: FSM 2-YEAR-OLD TAKE-UP BY SEN STATUS IN RECEPTION AND BY REGION



Source: EIF

It's not immediately clear why take-up would be higher among children identified for SEN support in Reception. A priori, we might expect parents of children with the highest level of need to find it harder to access suitable provision locally. However, the recent qualitative report published as part of the SEED review (Griggs and Bussard 2017) found that of the eight case study interviews, parents and providers felt there was sufficient provision for children with special educational needs or disabilities (SEND). Having a SEN statement is one of the non-economic criteria for entitlement to the 2-year-old offer, potentially offering an additional route for identification and targeting of the offer.

Furthermore, being identified for SEN support (with or without a statement) is less likely in Reception compared to later years of schooling. Latest DfE figures¹⁰ show that around 8% of children aged 4 in schools have SEN support, compared to 15% aged 10 (DfE 2017b). Therefore, higher childcare take-up might reflect parents that are more assertive about their children being assessed for SEN early during their schooling, which may also be associated with families more likely to take up childcare. Blanden et al (2017) identified higher take-up among SEN 3-year-olds born either side of the date-of-birth cut-off for the 3-year-old entitlement. They speculate higher identification of needing additional support may be a positive consequence of attending childcare: that is, these children will have been observed by qualified staff for a longer period of time, leading to greater likelihood of being assessed in Reception.

10 DfE (July 2017) Special educational needs in England: January 2017, table 3: <https://www.gov.uk/government/statistics/special-educational-needs-in-england-january-2017>

Local area economic characteristics

Local area economic characteristics may directly influence or help explain variation in take-up among disadvantaged households in a number of ways. How prosperous the area a child lives in could affect the supply of places – potentially in both directions, with higher-income communities demanding greater privately funded provision leading to greater aggregate supply, or by privately funded places crowding providers’ capacity to expand and take additional children through government-funded hours. In addition, local area economic characteristics may provide a finer-grained assessment of the relative level of income of children’s individual households than the simple binary FSM indicator allows.

In this analysis we use two variables to assess local economic drivers:

- **Income Deprivation Affecting Children Index (IDACI):** This is a highly localised measure of economic deprivation estimated at the lower super output area (LSOA) level.^{11,12} It captures factors such as benefits claiming rates and household income within the localised geographic area. Higher IDACI scores relate to higher overall levels of local deprivation.
- **Average FSM rates at the local authority district (LAD) level:** For the 2014/15 cohort of 2-year-olds we estimate the average rate of FSM within the local authority district. This provides a wider assessment of the economic prosperity of the local area in which the children live, with higher rates of FSM associated with greater levels of deprivation.

Figure 2.8 shows the relationship between take-up of the 2-year-old offer among FSM children and IDACI scores. IDACI scores have been ranked from low to high deprivation and average take-up rates estimated for individual IDACI percentiles. The volatility in the series shows the low number of observation for some IDACI bands. There is a slight upward relationship between take-up and living in more highly deprived neighbourhoods, as measured by IDACI. That is, FSM children living in more highly deprived neighbourhoods are more likely to take-up the childcare offer. This is true both inside and outside of London.

Figure 2.9 shows the relationship between take-up (averaged at the local authority district level) and the average FSM rate within the same area. This relationship is negative, suggesting lower take-up in local authorities with higher rates of FSM.

The finding that higher rates of neighbourhood deprivation (as measured by IDACI) are associated with higher rates of take-up is broadly consistent with Campbell et al (2018), who found the gap between FSM and non-FSM pupil take-up of the 3-year-old free entitlement was lower in areas with higher rates of local deprivation. They speculate this may reflect more effective targeted outreach to households in these communities or the nature of provision available locally. Other explanations include potential peer effects, whereby economically disadvantaged families may be less likely to take up childcare if the family background of children in those available settings is significantly different to their own.

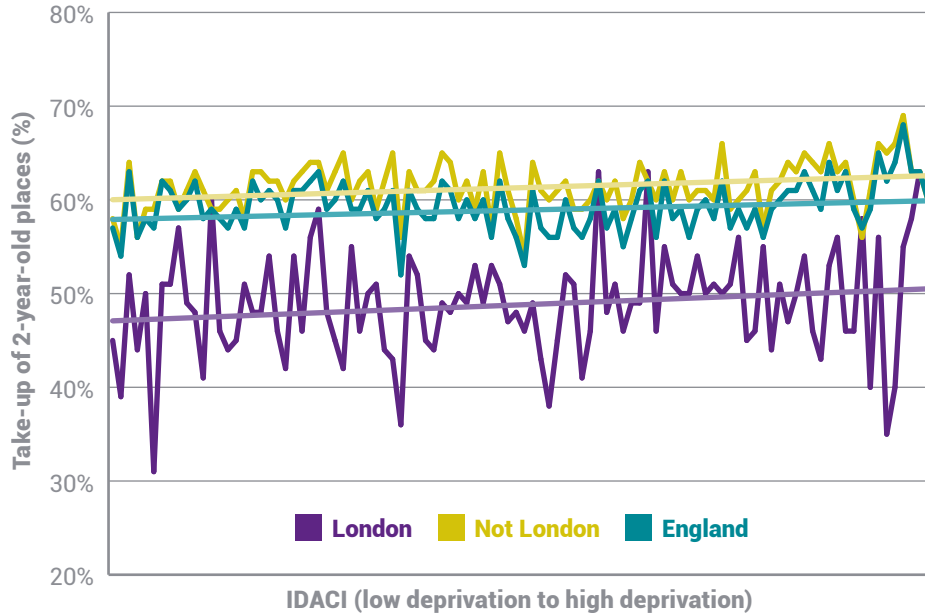
The negative relationship between FSM rates and take-up (average FSM rates at the local authority district level), may reflect wider local authority factors, such as demographic composition.

11 IDACI captures the percentage of all children in an LSOA who are in families claiming out-of-work benefits (income support, income-based job seeker’s allowance, pension credit guarantee) or whose equivalised income is below 60 per cent of the median income before housing costs (DCLG 2011)

12 Lower-level geographic units constructed by the ONS of between 400–1,200 households, see: <https://www.ons.gov.uk/methodology/geography/ukgeographies/censusgeography>.

For both measures of deprivation, however, the simple measure of association is quite weak – that is, when not controlling for other factors, there is a large amount of variation. On their own, therefore, these measures do not provide a strong individual means of targeting take-up.

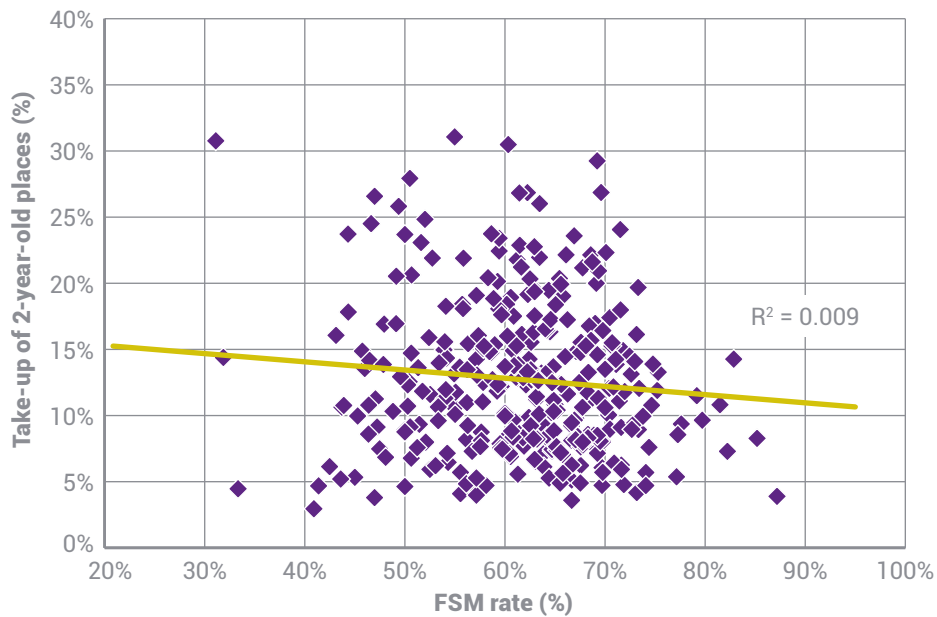
FIGURE 2.8: FSM 2-YEAR-OLD TAKE-UP BY LOCAL AREA DEPRIVATION (IDACI), 2014/15



Source: EIF

Note: Average take-up rates are estimated within IDACI percentiles measured from lowest to highest deprived.

FIGURE 2.9: FSM 2-YEAR-OLD TAKE-UP VERSUS FSM ELIGIBILITY, BY LOCAL AUTHORITY DISTRICT



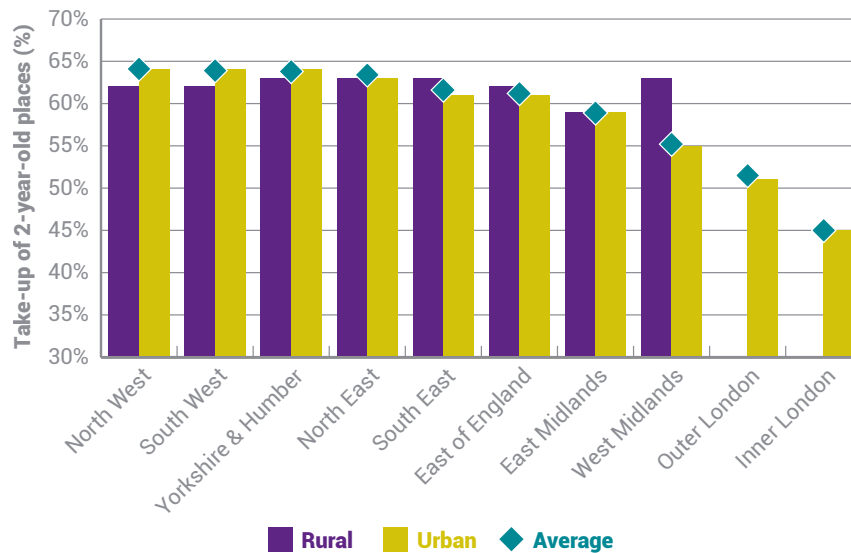
Source: EIF

Access to places

Clearly, access to places is likely to be a key factor in determining whether a child takes up a place. Access can be thought of as reflecting both the constraints around families' ability to reach suitable provision (that is, because they live too far from providers) and the relative supply of places, reflecting both the aggregate number of places locally and pressure for places due to demand.

It is challenging to assess the relative distance individual children live in relation to providers and what constitutes an accessible place. In our simplifying analysis, we compare take-up rates between children living in urban and rural areas, based on ONS classifications for the LSOA in which children live. Overall, average take-up is slightly higher in rural areas compared to urban areas (62% compared to 59%) for our sample of children. Figure 2.10 shows take-up calculated at the regional level, split by urban and rural areas. There is no clear overall pattern. The fact that average take-up is higher in rural areas may reflect other factors, other than simply accessibility of provision.

FIGURE 2.10: FSM 2-YEAR-OLD TAKE-UP BY RURALITY AND REGION, 2014/15



Source: EIF

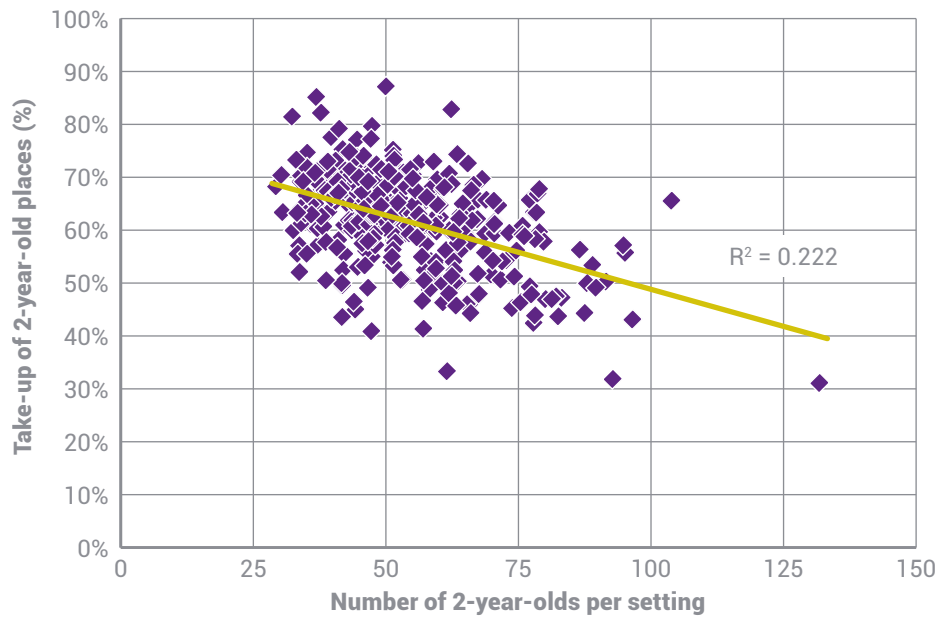
In terms of the impact of the overall supply, it is also hard to disentangle the influence of cause and effect. We only observe the total number of providers offering government-funded childcare and the children that attend. Take-up may be low because there are not enough places locally or supply of places may be low because there is insufficient local demand.

As an attempt to overcome this issue, we've calculated a measure of local capacity constraints. We take the total number of 2-year-olds identified as FSM eligible in Reception and divide this by the total number of providers that offer government-funded 2-year-old places. This is done at the local authority district (LAD) level. In areas where the total potential demand for government-funded 2-year-old places is high relative to the overall supply of funded places, we'd expect take-up to be lower if capacity constraints were leading to lower take-up.

Figure 2.11 shows an overall negative relationship between take-up and the number of 2-year-olds relative to the number of providers. This provides some evidence that absolute capacity constraints could in part be leading to lower take-

up in certain areas. Of course, other local area characteristics may be driving this simple descriptive relationship.

FIGURE 2.11: FSM 2-YEAR-OLD TAKE-UP BY LOCAL AUTHORITY DISTRICT VERSUS NUMBER OF 2-YEAR-OLDS PER SETTING, 2014/15



Source: EIF

Local provider mix

As reported by Campbell et al (2018), the mix of provider types in a local area has a significant impact on the take-up of the 3-year-old offer. As already noted, they found that a high proportion of maintained providers (that is, state schools and nurseries) is associated with lower take-up across all children. However, they found the gap in take-up between FSM and non-FSM pupils is lower in areas with higher maintained provision, suggesting that school places accept a disproportionate share of children from low-income families at age 3.

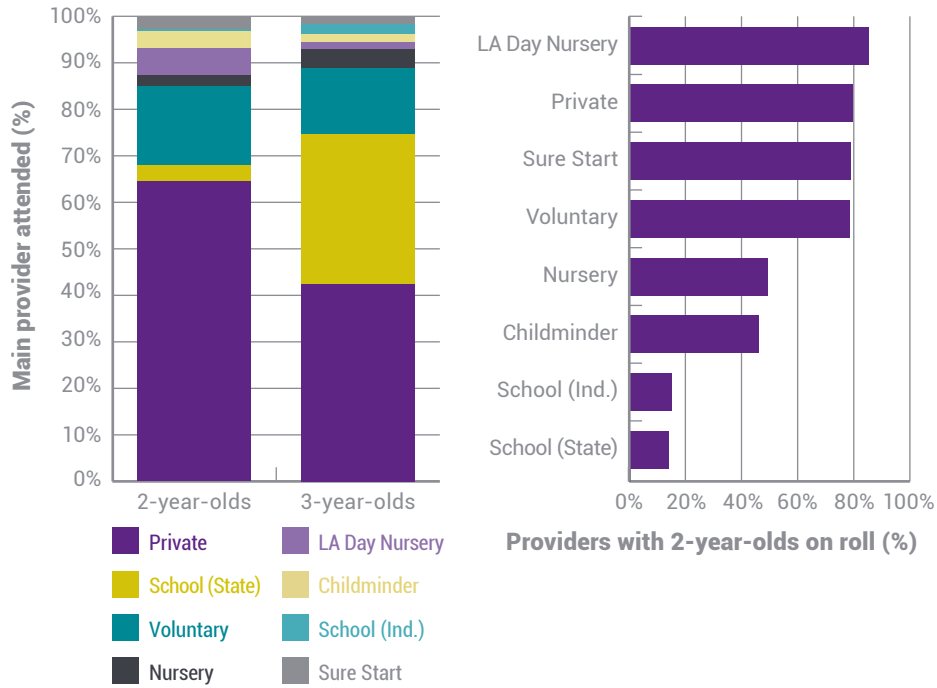
Figure 2.12 shows the types of setting attended¹³ and the proportion of providers accepting 2-year-olds¹⁴ in 2014/15. At age 2, 82% of children attended a private or voluntary provider, compared to 6% attending a state school or nursey. At age 3, this compares to 57% of children attending a private or voluntary provider and 36% attending maintained provision. The greater concentration of 2-year-olds in privately, voluntarily and independently-run (PVI) settings is borne out by the higher proportion of PVI settings that have 2-year-olds on the roll. Around 80% of private settings had 2-year-olds on the roll in 2014/15, compared to 14% of state schools that also provided childcare to 3-year-olds.

Figure 2.13 shows the relationship between the take-up rate by local authority district and the proportion of providers offering 2-year-old places that are in PVI settings. There is a positive relationship, indicating that where there is a greater concentration of providers that are PVI settings there is also higher overall take-up.

13 A small number of children are shown to attend more than one provider in a given year. Main provider is determined on the basis of the setting in which children spend the greatest number of hours.

14 Using school and early year censuses we consider all providers that enrolled children that were at least 3-years-old in January 2014/15 and of these estimate the proportion that also had 2-year-olds in attendance.

FIGURE 2.12: MAIN SETTING ATTENDED BY 2- AND 3-YEAR-OLDS, AND PROPORTION OF PROVIDERS WITH 2-YEAR-OLD PLACES, 2014/15

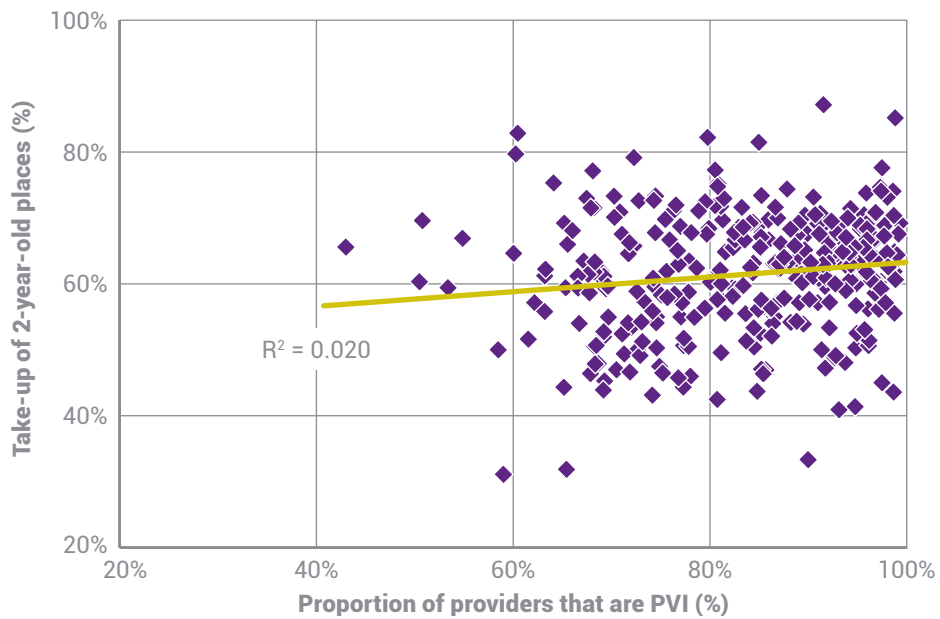


Source: EIF

Notes: In the small number of cases where pupils attended more than one setting, providers are included where the child spent the majority of their total hours of childcare.

Provider list is based on all individual providers catering for 2- or 3-year-olds receiving some government-funded childcare, as at January 2015.

FIGURE 2.13: FSM 2-YEAR-OLD TAKE-UP VERSUS LOCAL PROVIDER MIX (PROPORTION OF PVI SETTINGS), BY LOCAL AUTHORITY, 2014/15



Source: EIF

2.7 Regression analysis

In this section we combine the factors we have considered above in a simple regression framework to predict at the individual pupil level the likelihood of FSM pupils taking up the 2-year-old offer. Regression analysis allows us to test more robustly how the individual factors previously discussed combine to explain differences in take-up.

The main factors looked at include:

- **Pupil-level characteristics:** age of child at census (measured by month of birth), ethnicity and whether English is an additional language spoken at home, SEN status, and gender.
- **Local area economic factors:** local area deprivation (IDACI) and wider area-based deprivation measured by the average FSM rates within the local authority district.
- **Access to places:** whether pupils live in rural areas, the relative demand for places measured by the local concentration of 2-year-olds per provider, and the proportion of local providers offering 2-year-old places.
- **Local provider mix:** measured by the proportion of providers locally that are a private, voluntary or independent (PVI) setting.

As in the other analysis in this section, we consider take-up among FSM children in, 2014/15, and for children born between January and August. This includes a sample of around 65,000 pupils.

CALCULATING ODDS RATIOS

Using our sample for 2014/15, the probability of an FSM child in London taking up a place is 49%, compared to 61% outside of London. The odds of non-London FSM children attending are 1.59 to 1, compared to a London child attending.

Location	Attended age 2?	Probability (p)	Odds (p/(1-p))	Odds ratio (London vs Non-London)
Non-London	No	39%	0.63	-
Non-London	Yes	61%	1.59	-
London	No	51%	1.04	1.66 (1.04/0.63)
London	Yes	49%	0.96	0.60 (0.96/1.59)

Dividing the odds of a London FSM child attending aged 2 by the odds of a non-London child attending derives the odds ratios. The figures imply the odds of an FSM child in London taking up a 2-year-old place are 40% less than for child outside of London (1 minus 0.6).

We use a logistic regression to test the factors that influence the binary outcome of whether or not FSM pupils took up the 2-year-old offer. The results are presented as odds ratios. Intuitively these are not easy to interpret. The boxed text above provides an explanation of how odds ratios are calculated. In simple terms, the estimates show the influence individual drivers have on the odds of whether or not a child attends childcare, controlling for all other factors. A value of less than 1 implies a negative relationship and a value of greater than 1 implies a positive relationship.

Table 2.2 provides the output from this analysis.

TABLE 2.2: LOGISTIC REGRESSION – ODDS OF FSM CHILDREN TAKING UP 2-YEAR-OLD FREE CHILDCARE, 2014/15

Variable of interest	Odds ratios
Month of birth (compared to January)	
February	0.958
March	0.956
April	0.882***
May	0.846***
June	0.845***
July	0.792***
August	0.764***
Child & household characteristics	
Ethnicity (non-White British compared to White British)	
English is not an Additional Language (Non-EAL)	0.885***
English is an Additional Language (EAL)	0.504***
Missing†	0.890***
SEN (compared to non-SEN)	1.174***
Male (compared to Female)	1.013
Local economic factors	
LSOA: IDACI Score (2015)	1.821***
LAD: FSM Rate (Reception)	0.351***
Access to places and provider mix	
LSOA: Living in a rural area (compared to urban)	0.914***
LAD: 2-year-olds per provider (in 2013/14)	0.997***
LAD: Providers with no 2-year-olds (%) (in 2013/14)	0.562***
LAD: Providers that are PVI (%)	1.391**
Location	
London	0.885***
<i>Observations</i>	<i>65,170</i>
<i>Pseudo R-squared</i>	<i>0.023</i>

* p<0.10; **p<0.05; *** p<0.01

† Includes all pupils where either ethnicity on primary language spoken at home were not known or reported. This also includes the small number of pupils recorded as White British and where English was not the primary language spoken at home.

Some of the main findings from this analysis are:

- Take-up is gradated by **date of birth** – the odds of children taking up free childcare decrease the younger the child was at the time of the census. The odds of a child born in August (who would have been aged 2 and 4 months at the time of the census) attending are 24% lower than a child born in January (who would just be turning 3).
- **Children’s ethnicity**, and in particular whether English is a second language spoken at home, is negatively related to take-up. The odds of non-White British children for whom English is a second language taking up childcare aged 2 are 12% lower than for White British pupils. For pupils for whom English is an additional language, the odds are 50% lower.
- **SEN status** is positively related to take-up. The odds of pupils who are SEN (with or without a statement) are 17% greater than for non-SEN pupils. As noted previously, we do not know the extent this reflects the characteristics of pupils and families who are assessed for SEN early in their time at school, the impact of having attended childcare and its impact on being assessed for SEN entitlement, or other factors that may explain higher take-up among these children.
- **Local economic characteristics** show a mixed picture. When looking at local neighbourhood deprivation (measured via IDACI) we see a positive relationship – that is, FSM children in more deprived neighbourhoods are more likely to take up the offer. However, when we look at wider area measures of deprivation (local authority district FSM rates) we see a negative relationship. This wider measure could be picking up local authority specific effects not directly related to deprivation that are not otherwise controlled for in the model.
- In our descriptive analysis, we found take-up to be higher in **rural compared to urban areas**. However, this didn’t control for any individual or other local area characteristics. When these factors are included, we now see children are less likely to take up the offer if they live in a rural area; the odds of take-up are 9% lower for children living in a rural compared to urban area.
- In terms of **local capacity and provision of places**, as discussed, it is challenging to isolate the effect.¹⁵ Despite these limitations, we use two variables: the ratio of 2-year-olds to the number of providers offering 2-year-old places; and the proportion of childcare providers within each local authority district that don’t take any 2-year-olds. Both variables show a statistically significant negative relationship.¹⁶
- In terms of **local provider mix**, we find that every 1 percentage point increase in the proportion of providers that are PVI operating within the local authority district within which the pupil lives, leads to a 39% increase in the odds of an FSM pupil taking up free childcare.

15 As previously discussed, we do not observe the supply of places, only the number of pupils that attend – meaning we cannot isolate whether it is low local demand leading to low supply of places or low supply of places driving low take-up.

16 Both variables are estimated at the local authority district level and are ‘lagged’ – that is, taking the value from the year before. The later step is to help mitigate some of the problems with trying to capture the effects of pressures on capacity using the actual number of pupils that attended in the same year.

Overall the variables included in this modelling explain around 70%¹⁷ of the difference in take-up rates between London and areas outside of London. Naturally there is uncertainty in these estimates and there are many factors that it has not been possible to include. In particular, we have limited household-level data (such as income, employment or the availability of alternative childcare – such as with friends/relatives – or anything relating to parental preferences). Nonetheless, we appear to be identifying many of the elements that are associated with differences in take-up.

17 The box above shows the odds of 2-year-old take-up are 40% lower in London, when no other factors are controlled for. When all relevant factors are included in our model, this falls to 12%, implying our models explain around 70% of the odds of lower take-up in London.

2.8 Conclusions and recommendations

DfE child-level data does not provide direct identification of 2-year-olds that could have taken up the offer but didn't. We have used a novel strategy to identify pupil-level take-up among low-income households. Although there are limitations in our strategy, we believe we're able to demonstrate a good fit with DfE's own estimates of local area take-up. Many of our findings are consistent with those of others who have looked at take-up of childcare among older children. However, our analysis provides a useful contribution to meeting DfE's objective of improving the take-up of childcare among disadvantaged children.

Some of the main findings from this analysis are:

- Age of child at the time of the census is a strong predictor of whether or not they attend: younger children appear less likely to take-up the offer. Our descriptive analysis of the first eligible cohort shows take-up was particularly low for those who turned 2 after the beginning of the school term.
- Children's cultural and linguistic differences appear to be a barrier to take-up, with take-up particularly low for children where English is a second language.
- Take-up is higher in the most disadvantaged neighbourhoods. This may relate to the ability to target intervention more readily when disadvantaged communities are more geographically concentrated.
- Once other factors are controlled for, children in rural areas are less likely to attend, suggesting families in more dispersed geographic areas may have less access to provision.
- Although challenging to robustly test, our analysis suggests the absolute availability of places for 2-year-olds may further limit take-up. Maintained providers in particular (that is, schools and nurseries) are less likely to have 2-year-olds on the roll. Conversely, higher level of PVI provision shows higher association with take-up.

Our analysis cannot demonstrate what should be done to increase take-up, but it does highlight some important areas to investigate. This report recommends:

- Understanding the barriers to **take-up among the youngest children**. Our analysis cannot show whether those children who just turned 2 and do not attend do so later in the same year. It also cannot show whether this reflects parental reluctance to send children to childcare as soon as they turn 2, or whether providers find it harder to accept new pupils partway through the academic year. Nonetheless, if government wants to ensure children benefit from the maximum potential period of childcare, they should consider ways to support this group.
- As others have found for the 3-year-old entitlement, there are **cultural and language barriers** to attending childcare, with children from non-White British backgrounds and where English is a second language, less likely to attend. This appears largely independent of other confounding variables. Again, understanding how to reach out to these communities and supporting them in attending childcare could significantly boost take-up.

- We have shown that household-level factors alone do not explain local variation in take-up. The **supply of places for 2-year-olds** also acts as a constraint on take-up. In particular, maintained providers appear less likely to have offered 2-year-old places. Looking at measures to get maintained providers to expand places to 2-year-olds or to get new PVI providers to open in areas with a high level of maintained provision, should be considered.

To improve understanding of take-up, having termly data on children that are in funded childcare would be beneficial. We are limited by the once-yearly snapshot provided by the early years census. In order to understand the flows of children throughout the year and how take-up is affected by factors such as the point in the year in which they become eligible, termly attendance data (as is collected for schools and nurseries via the school census) would enhance our understanding.

3. Impact on early years outcomes

In this section we look at the emerging impacts that can be observed of the 2-year-old free entitlement on national measures of children's development at the end of Reception. We begin with a brief summary of some of the main UK literature on the impact of childcare on child outcomes. This is followed by an overview of the Early Years Foundation Profile (EYFSP) and a descriptive analysis of recent trends in EYFSP attainment, in particular, the gap between FSM and non-FSM pupils. Finally, we use two methods to test whether effects from the introduction of the 2-year-old entitlement can be found at the end of Reception in academic years 2015/16 and 2016/17.

The main findings are:

- Total scores on the EYFSP are highly bunched, with nearly 30% of FSM pupils achieving the same score in 2016/17. Overall, detecting fine movements in this measures will be challenging.
- Nationally, over the past five years, the gap between FSM and non-FSM pupil attainment has been falling. However, the rate at which the gap has closed did not accelerate notably in 2015/16 and 2016/16, the first years in which the effects from the 2-year-old offer would be seen.
- However, there is considerable regional variation. The proportion of FSM pupils making a *good level of development* at age 5 has increased by as much as 21 percentage points at the local authority level since 2014/15. Gains have been particularly high for those areas that were previously underperforming.
- We find mixed evidence of the impact of expansion of provision of childcare for 2-year-olds on FSM pupils' EYFSP results:
 - In the first year, we find no relationship between the number of months of entitlement children had and pupil-level differences in attainment.
 - However, when looking at changes in attainment at the local authority level we do detect a small positive relationship between increases in take-up over the first two years of implementation of the entitlement and increases in attainment of FSM children.

3.1 Literature summary

There is compelling evidence that attending high-quality early years childcare can have significant positive impacts on a range of child outcomes, including cognitive, behavioural, social and physical development (see for example, Sylva et al., 2014; Melhuish et al., 2015). Findings from the UK Effective Pre-school, Primary and Secondary Education (EPPSE) longitudinal study have had some of the most enduring impacts on UK policy development. The study followed a cohort of around 3,000 children born in 1997, who attended formal childcare and a smaller group of around 300 children who had not. Later follow-up consistently showed significant positive effects from attending preschool, when controlling for a range of child, household and schooling-level factors. By age 16, having attended preschool positively predicted higher GCSE scores (Sylva et al., 2014). Greater effects were found for those who attended for longer periods and where the settings were of higher quality, particularly when children's parents had low levels of qualifications. Attending high-quality settings were also shown to be linked to better self-regulation, pro-social behaviour and lower levels of hyperactivity at

age 16. Although significant, these findings relate to a cohort of children attending childcare in the early 2000s – since then, the structure and availability of provision in the UK has changed considerably.

The more recent SEED evaluation is a new longitudinal study following around 5,600 children born between September 2010 and August 2012 in England. As such, it captures those children first eligible for the 2-year-old entitlement. The latest findings report impacts on outcomes at age 3 (Melhuish et al., 2017). They show a range of positive effects from attending childcare between the ages of 2–3 across all children, having controlled for a range of child characteristic, parenting and home environment variables. On cognitive outcomes, positive effects were found on one of the two measures reported, for children attending childminders and informal care (that is, friends/relatives). No effects were found for children attending group-based provision, where the majority of government-funded childcare takes place. On the non-cognitive measures, a range of positive effects were found for children attending childminders and group settings. These findings reflect the impact across all children, not just those eligible for government-funded childcare.

Not all UK studies have pointed to universally positive impacts, particularly in relation to the expansion of government-funded provision. The evaluation of the disadvantaged 2-year-old pilots¹⁸ (Smith et al., 2009) tracked a sample of around 1,000 children who took up a place in one of the pilot local authorities. Changes in outcomes were compared with a matched control group of children from similarly deprived areas where the pilots were not trialled. On average, the evaluation found no statistically significant differences in outcomes between children in the pilot and comparison groups on outcomes at age 3. However, when looking at the subgroup of children that attended high-quality settings, positive impacts were observed on children’s vocabulary and in the relationship with their parents. A later follow-up study (Maisey et al., 2013) on the same children found similar effects when looking at the impacts on the Early Years Foundation Stage Profile (EYFSP) at age 5. For children who participated in the pilots, there was no evidence of better EYFSP performance on average. However, again, for children who attended a high-quality setting, their performance was found to be better than those who attended low- or adequate-quality providers.

Furthermore, Blandan et al. (2016) analysed the impact of the significant expansion of government-funded childcare for 3-year-olds that occurred between 2002 and 2007 on nationally assessed attainment measures at ages 5, 7 and 11. The research exploited the variation in the pace of roll-out across local authorities to assess the impact that availability of government-funded places. Across all pupils they found modest increases in literacy and numeracy scores at age 5 in areas with larger increases in government-funded provision. By age 7, the effects were essentially zero. For most children, the small effects are perhaps not surprising. The introduction of government-funded childcare is shown to have substituted for childcare that otherwise would have been paid for by families. For children from economically disadvantaged households, however, the introduction of government-funded provision was shown to have increased formal childcare usage. Yet, for these children, the impact was still shown to be fairly modest at age 5 and to have dissipated by age 7. They speculate that the creation of new places, which were almost entirely in the private sector, were of insufficient quality to lead to sustained improvements in attainment.

18 Between 2006 and 2008, free early years education was piloted among nearly 14,000 disadvantaged 2-year-olds across 32 local authorities.

3.2 Measures of progress

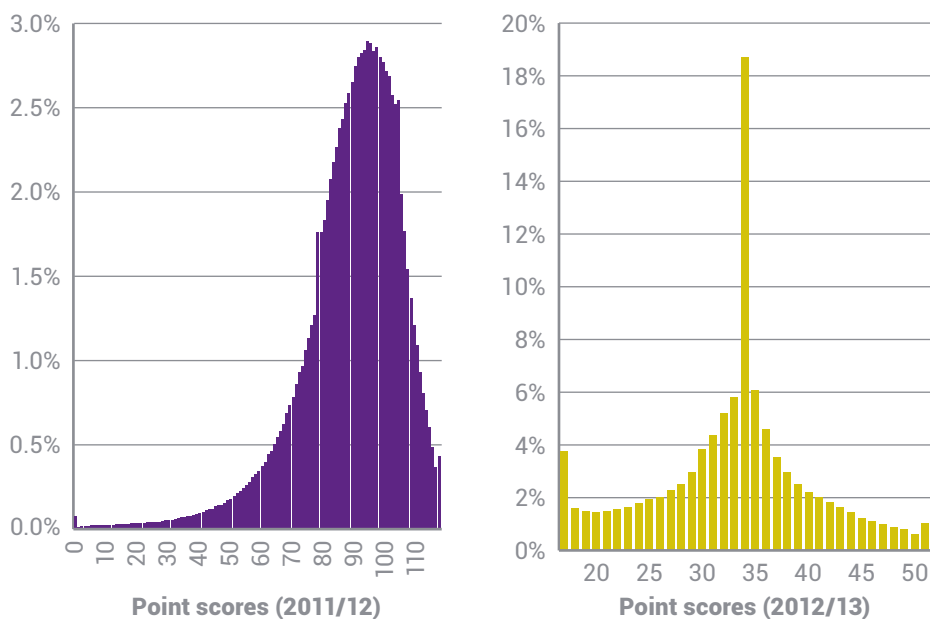
Early Years Foundation Stage Profile (EYFSP)

In our analysis, we focus on the impact on EYFSP attainment. The EYFSP is an assessment of children's attainment at the end of the Reception year when children are typically aged 5. It is the earliest national assessment of children's development. Teachers provide an assessment of children's development against 17 areas of development or early learning goals (ELGs), spanning areas of cognitive, non-cognitive and physical development. These are grouped by seven domains, including:

- communication and language development
- physical development
- personal, social and emotional development
- literacy
- mathematics
- understanding of the world
- expressive arts and design.

For each ELG, children are scored on a three-point scale reflecting increasing levels of progress against each of the goals, ranked 'emerging' (1) 'expected' (2) and 'exceeding' (3). The current framework was introduced in 2012/13 and replaced the previous EYFSP assessment which assessed children against 13 learning goals on a 9-point scale (DfE 2012). Figure 3.1 compares the distribution of attainment scores between 2011/12 and 2012/13. The charts show that since the changes made to the EYFSP, the distribution to attainment has become highly bunched. In 2012/13, 19% of all children had the same combined score of 34, reflecting the equivalent of achieving a 2 ('expected') on each of the 17 subscales.

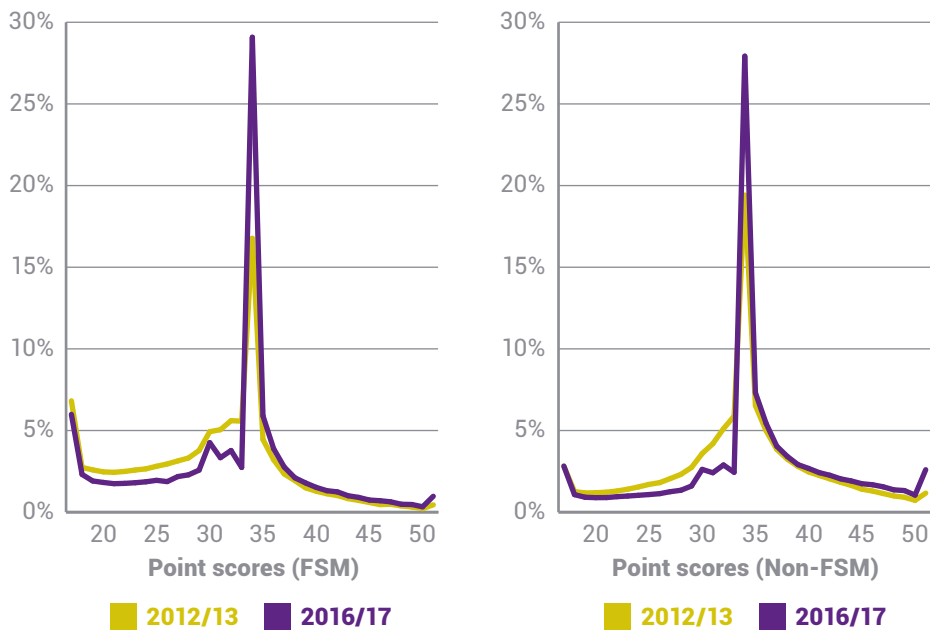
FIGURE 3.1: COMPARISON OF 2011/12 AND 2012/13 EYFSP RESULTS



Source: EIF

Figure 3.2 shows how the distribution of EYFSP scores have changed between 2012/13 and 2016/17. For FSM pupils, the proportion of pupils achieving less than 34 (the equivalent of achieving the ‘expected’ level against all 17 ELGs) decreased by 18 percentage points; for non-FSM pupils it fell by 15 percentage points. Over the same period, the proportion of FSM and non-FSM pupils achieving more than 34 points increased by 5 percentage points and 6 percentage points respectively. This shows that the majority of the gains over the period have been for achievement at the bottom of the attainment distribution. That is, overall attainment growth has largely been driven in improvements in pupils who previously fell below the expected level.

FIGURE 3.2: DISTRIBUTION OF POINT SCORES, 2012/13–2016/17



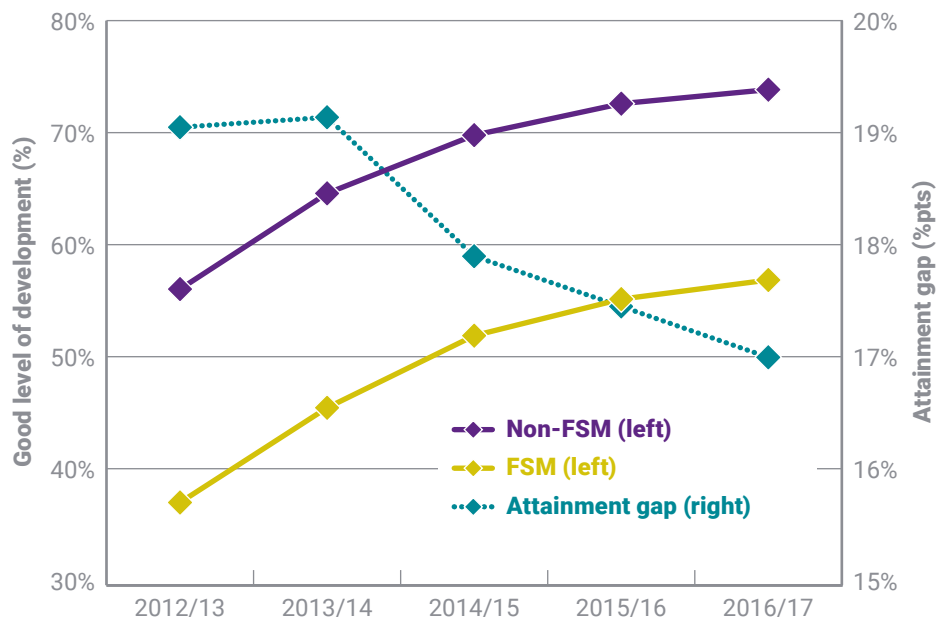
Source: EIF

In the remainder of this analysis we look solely at the proportion of pupils achieving a ‘good level of development’. This is a binary indicator, used by DfE, of whether or not children achieved at least the expected level in all of the ELGs under five of the seven learning domains (excluding understanding of the world and expressive arts and design). The rationale for using this measure, rather than the total point score, is that it is likely to detect more of the variation in attainment over the past five years, particularly for the FSM cohort who are the focus of the analysis.

3.3. Recent EYFSP trends

Figure 3.3 shows changes in the proportion of children achieving a good level of development over the past five years. Over the period, the attainment of both FSM and non-FSM pupils has increased, by 20 percentage points and 18 percentage points respectively. The size of the attainment gap has fallen from around 19 percentage points in 2012/13 to 17 percentage points in 2016/17, closing at an average of 0.4 percentage points per year. To put this in context, if we hypothetically assumed the gap were to continue to close at the same rate, it would be over 40 years before FSM pupils achieved the same as non-FSM pupils.

FIGURE 3.3: PUPILS MAKING A GOOD LEVEL OF DEVELOPMENT BY FSM STATUS, 2012/13–2016/17

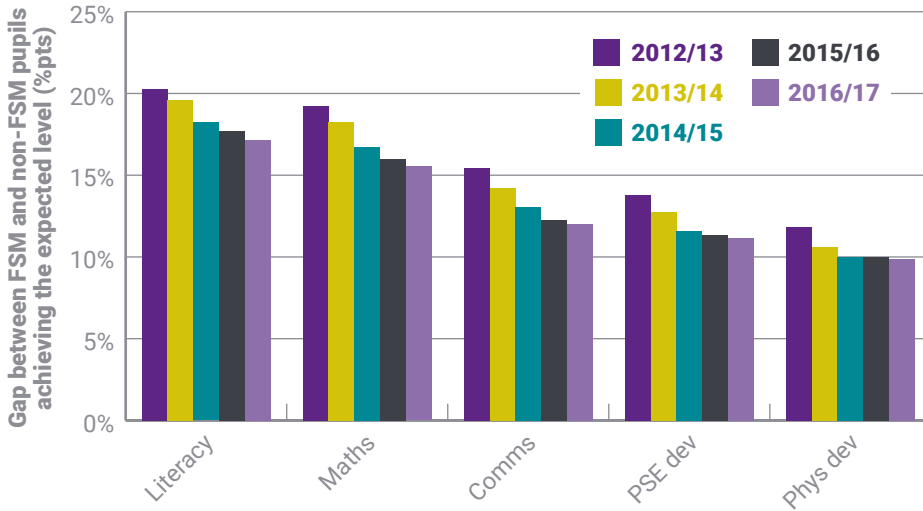


Source: EIF

Over the period the rate of growth in attainment has slowed. FSM and non-FSM attainment increased by 15 percentage points and 14 percentage points respectively between 2012/13 and 2014/15, but by 5 percentage points and 4 percentage points respectively between 2014/15 and 2016/17. This may suggest that many of the easier gains in terms of raising attainment at the bottom of the distribution have already been made. The reduction in the pace of growth is noticeable since the first two cohorts of children eligible for the 2-year-old offer were appearing in the 2015/16 and 2016/17 attainment results.

Figure 3.4 shows the change in the attainment gap between FSM and non-FSM pupils, against each of the five domains included in the assessment of whether pupils achieve a good level of development. The charts show a fairly consistent pattern across each of the domains. The gap between FSM pupils and non-FSM pupils has closed by the largest amount for literacy and mathematics, falling from 20 to 17 percentage points and 19 to 16 percentage points respectively over the past five years. However, these remain the domains where the gap between FSM and non-FSM pupils is the greatest. For areas such as personal, social and emotional (PSE) development and physical development, the rate at which the attainment gap is closing has levelled off in recent years.

FIGURE 3.4: DIFFERENCE BETWEEN PROPORTIONS OF FSM AND NON-FSM PUPILS MAKING EXPECTED LEVEL OF DEVELOPMENT BY DOMAIN, 2012/13–2016/17

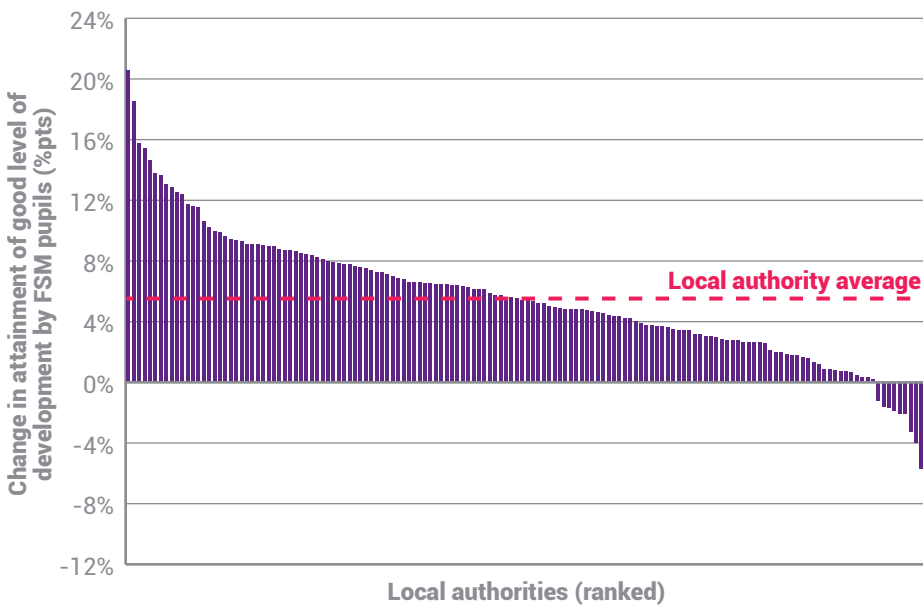


Source: EIF

Despite the rate of growth in attainment flattening, there has been considerable regional and local variation. Figure 3.5 (over) shows how FSM attainment has changed by local authority between 2014/15 and 2016/17. Over this period, the proportion of FSM pupils in the North East achieving a good level of development increased by an average of 9.5 percentage points. In the South East, FSM pupil attainment increased by 3 percentage points.

Figure 3.6 shows the change in FSM pupil progress by ranked local authority. The average increase has been 5.5 percentage points over the past three years.

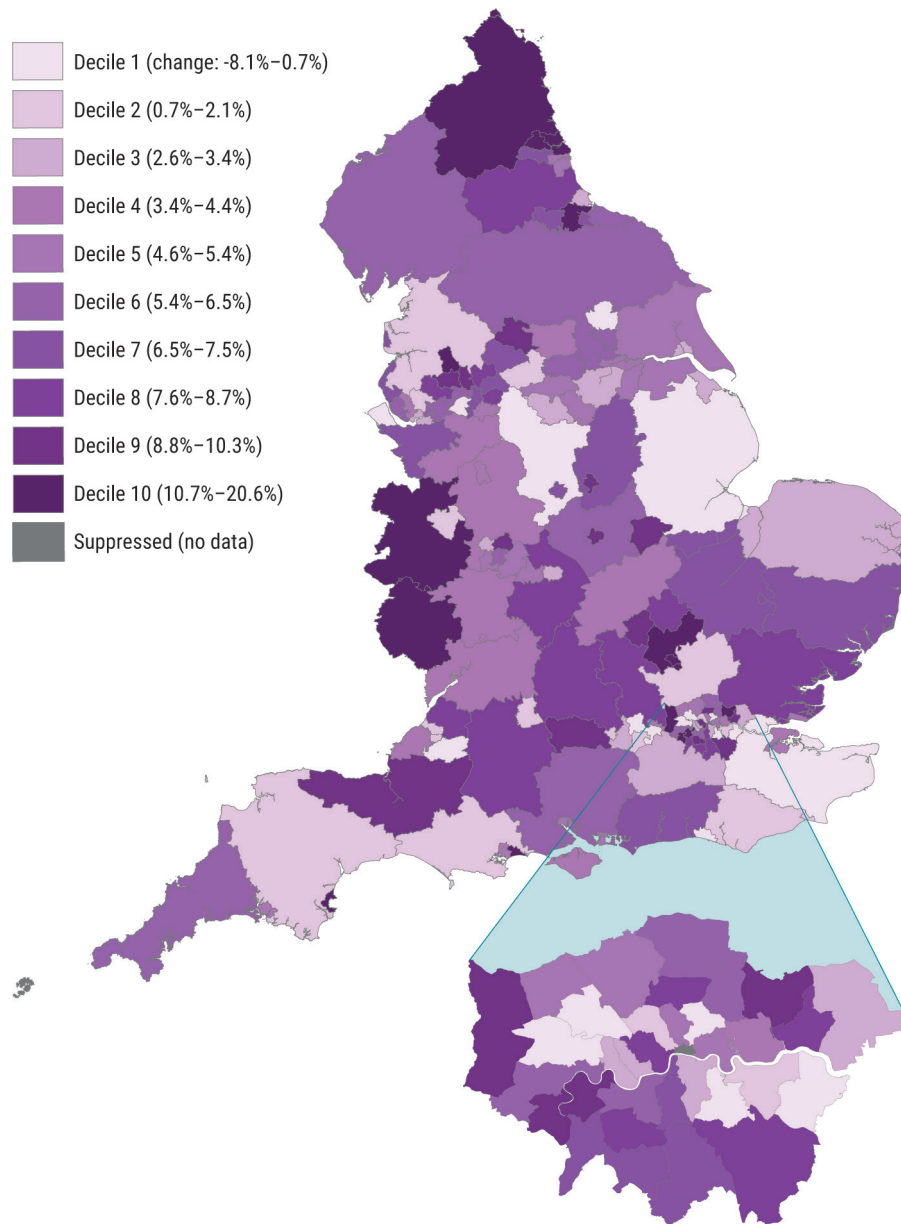
FIGURE 3.6: LOCAL AUTHORITY CHANGE IN PROPORTION OF FSM PUPILS ACHIEVING A GOOD LEVEL OF DEVELOPMENT, 2014/15–2016/17



Source: EIF

Note: Isle of Scilly, City of London and Rutland have been excluded due to the small number of FSM children.

FIGURE 3.5: CHANGE IN PROPORTION OF FSM PUPILS MAKING A GOOD LEVEL OF DEVELOPMENT, 2014/15–2016/17



Source: EIF

Note: Figures for the Isles of Scilly and City of London have been suppressed due to the small number of children.

Drilling into this further, table 3.1 shows the top 10 local authorities in terms of increases in FSM pupils achieving a good level of development. The largest increase was seen in Herefordshire, with an increase of 21 percentage points. Over the three years, Herefordshire improved from 147th to 40th in terms of FSM attainment among the 149 local authorities included here. The biggest gains have been seen in local authorities with the lowest level of attainment to begin with. Of the top 10 local authorities in terms of relative FSM improvement, eight out of the 10 were in the bottom half of all local authority performance in 2014/15, with three of the local authorities here taking up the bottom three positions.

TABLE 3.1: 10 MOST-IMPROVING LOCAL AUTHORITIES IN TERMS OF PROPORTION OF FSM PUPILS MAKING A GOOD LEVEL OF DEVELOPMENT, 2014/15–2016/17

Local authority	Region	Rank among all local authorities		Change in proportion making good level of development (%pts)
		2014/15	2016/17	
Herefordshire	West Midlands	147	40	21%
Stockton-On-Tees	North East	149	84	19%
Central Bedfordshire	East of England	148	89	16%
South Tyneside	North East	121	32	15%
Redbridge	Outer London	73	10	15%
North Tyneside	North East	127	54	14%
Richmond upon Thames	Outer London	117	44	14%
Shropshire	West Midlands	129	61	13%
Blackburn with Darwen	North West	145	108	13%
Bournemouth	South West	68	13	13%

Some caution is needed when interpreting individual local authority results. The number of FSM children in each Reception cohort in these 10 local authorities lies between 200–450, meaning they are relatively small; changes in composition within each area year-on-year will therefore lead to some volatility in the average performance for this group. Nonetheless, this shows that there is considerable local authority variation in how FSM pupil attainment has changed, and some local authorities have seen particularly large gains. The extent to which these gains reflect genuine improvements in underlying performance, as opposed to simply reverting to the trend attainment for FSM pupils, is not possible to say.

3.4 Regression approach

In order to assess the impact of the take-up on EYFSP scores, we cannot simply look at the results for children who attended compared to those who didn't. Children who attend childcare will be systematically different to those who didn't for reasons that cannot fully be observed.

Therefore, we use two techniques to try and isolate the independent effect of the expansion of funded childcare at age 2 on the EYFSP attainment of FSM pupils:

- **Method 1:** It is well established that within each year group, younger children's educational performance is worse on average than older children when assessed at the same point in time. The implementation of the 2-year-old entitlement meant in the first year younger children were eligible for more months of additional childcare. We exploit this difference to test whether the additional months of childcare offered to younger children was enough to close the gap with their older peers.
- **Method 2:** We have shown take-up of the 2-year-old offer and changes in attainment have varied across local areas. In the second approach, we test whether there is a relationship between changes in local authority-level take-up and changes in FSM pupils' EYFSP performance across the first two years of implementation.

There are a few things to be aware of:

- We do not know what type of childcare (formal or informal) children may have received had the 2-year-old entitlement not been introduced.
- We have already set out some of the limitations of the EYFSP to use in tracking changes in progress; in particular, the highly bunched nature of the performance distribution means picking up subtle changes in attainment will be challenging.
- EYFSP attainment data is the only outcome measure collected nationally at the pupil level. This analysis cannot report on other cognitive or non-cognitive child outcomes, or other outcomes at the household level (such as changes in maternal employment).

On the first issue, some FSM children may have been receiving the original 10 hours of childcare for 2-year-olds available prior to 2013. However, not all FSM children were eligible, as it used a more restrictive criterion to the legal entitlement introduced from 2013 (Gibb et al 2011) and the funding provided far fewer places. Furthermore, this was not an entitlement and there was no ring-fence on the funding; we do not know how well it reached the intended population. However, we have no data for those children receiving 2-year-old childcare prior to 2013 as it was not collected via the early years census. Nonetheless, the introduction of the entitlement from 2013 represents a significant expansion to the number of hours available to children from economically disadvantaged households, compared to the original provision.

On the second and third issues, we recognise there are limitations in using the EYFSP results to assess pupil progress. However, it is the main national measure of pupil progress in the early years. The EYFSP handbook states that its main uses are: to inform parents about their child's development; to support a smooth transition to key stage 1; to help Year 1 teachers plan an effective curriculum that will meet the needs of all children; and to enable DfE to monitor changes in levels of children's development both nationally and locally (DfE 2017c). Within this context, it is an appropriate measure to use. However, assessing the impact on wider pupil outcomes is not possible with this data, although there are many highly desirable potential benefits that cannot be captured.

Use of pupil-level administrative datasets to assess the impact of policy in the early years has come under some recent criticism, relating in particular to the quality and breadth of child development measures available, the lack of detailed household-level controls, and the lack of baseline measures of pupil progress.

Despite this, we believe it is defensible to use administrative data in this way, because:

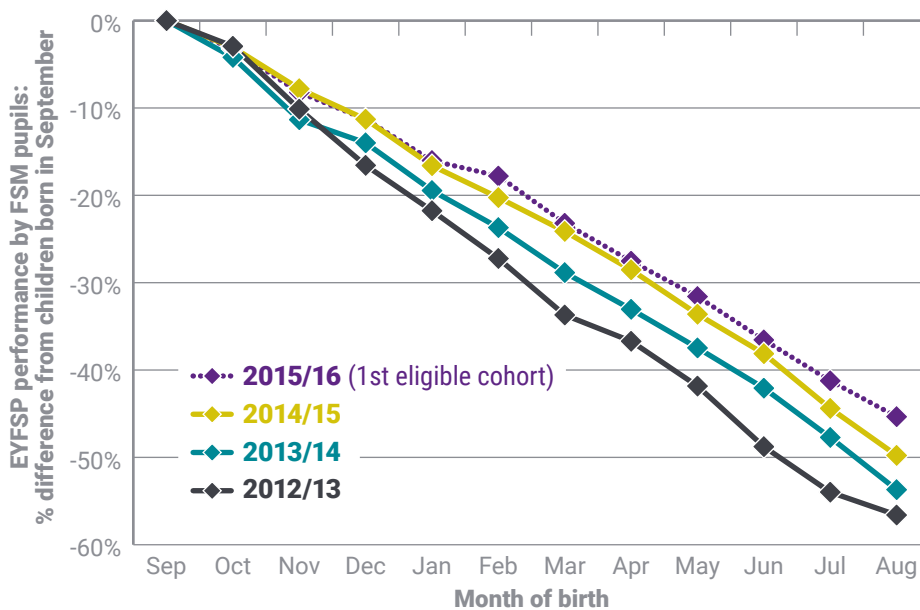
- administrative datasets provide very large sample sizes – hundreds of thousands of pupils are included in our models
- the techniques we use attempt to capture the direct impact of take-up of the expanded childcare offer for 2-year-olds from 2015, and explicitly control for the lack of baseline measures of pupil progress
- while we recognise the limits of using national measures of pupil progress, we use the main measure of early years pupil progress reported by the DfE.

Method 1: Differences in attainment by months of eligibility

It is well established that pupils’ age at the time of assessment is a strong predictor of their performance: children born later in the academic year and who are younger at the time of assessment perform worse on average than their older peers (see for example Crawford et al., 2010). This is a pattern across not just the early years but later school performance measures as well. Intuitively this makes sense: children’s age within the same year group can vary by almost a year at the time of assessment.

Figure 3.7 shows the proportion of pupils achieving a good development by month of birth. Estimates show the percentage difference between pupils born in each month relative to pupils born in September.

FIGURE 3.7: FSM PUPILS MAKING GOOD LEVEL OF DEVELOPMENT BY MONTH OF BIRTH, 2012/13–2015/16 (% DIFFERENCE RELATIVE TO SEPTEMBER BIRTH)



Source: EIF

The chart shows that younger children in each cohort are shown to perform worse than older pupils. For instance, for 2012/13 EYFSP performance, FSM pupils born in August were 57% less likely to achieve a good level of development, compared to pupils born in September. The chart also shows that the penalty for being born later has diminished over time. For the 2015/16 academic year, children born in August were 44% less likely to achieve a good level of development, compared to 50% in 2014/15 and 54% in 2013/14. This suggests that much of the gains in

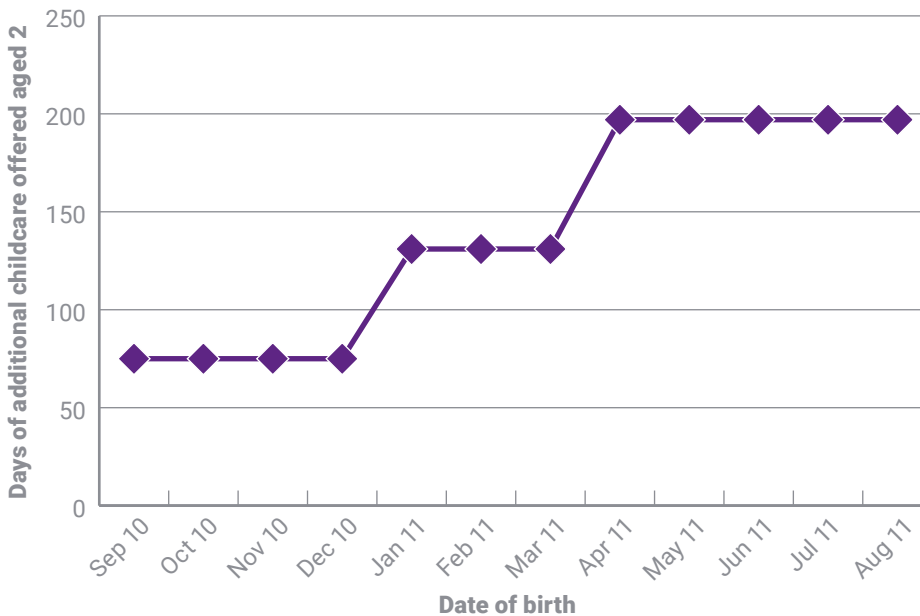
attainment over recent years have been due to improvements in performance of the youngest children in each cohort.

The 2-year-old offer was introduced from September 2013. Any child who was already 2 at the beginning of September would have been eligible from the date of introduction. This corresponds to all children reflected in the 2015/16 EYFSP data (the dotted line in figure 3.7). While all children in this cohort received some additional months of entitlement to childcare, the amount they were entitled to varied. Children first become eligible from the end of the term after they turn 2 and remain eligible until the end of term in which they turn 3, at which point they may take up the 3-year-old offer. For the first eligible cohort, this meant:

- Children born in September 2010 would have been on the cusp of turning 3 in September 2013 and could have received a full additional term’s worth of entitlement that they previously wouldn’t have received. So too would children born from October–December.
- Children born from January–March would have been eligible for two terms’ worth of additional childcare.
- Whereas children born from April–August would have been eligible for a full additional year.

Figure 3.8 provides an illustration of the additional months of childcare children aged 2 would have been entitled to in 2013/14. If there is a positive relationship between the amount of childcare received and pupil development, then we would expect to see pupils born later in the year of introduction benefiting by more than children born at the start, and the pattern of effect would be broadly consistent with the pattern of additional months of childcare shown below.

FIGURE 3.8: ILLUSTRATION OF ADDITIONAL DAYS OF FREE CHILDCARE FOR CHILDREN AGED 2 IN 2013/14, BY MONTH AND YEAR OF BIRTH



Source: EIF

Note: Chart assumes that children are born at the end of each calendar month providing maximum additional days in which child could have received the full 15 hours of childcare.

The results in figure 3.7 show that the penalty for being born later did indeed reduce in 2015/16. This implies that the performance of the youngest children (who could potentially have received more additional childcare) improved by a greater amount than that of the oldest children (who could have received less additional childcare). However, as the age penalty had been reducing over time anyway, we cannot assume the relative improvement in 2015/16 for the youngest pupils was due to the effects of the national 2-year-old entitlement.

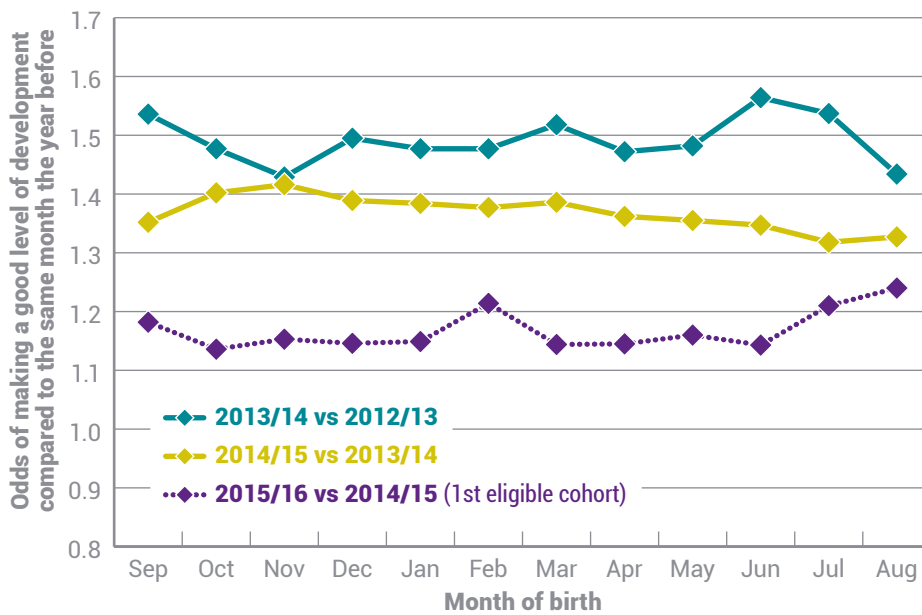
Method

In order to test whether there was anything different about the relationship between month of birth and attainment in 2015/16, we run a series of logistic regressions to predict whether or not FSM children achieved a good level of development. The full output is reported in annex 2a. The models control for all observable pupil-level characteristics, including month of birth. We have run three regressions where we test the specific impact of month of birth in 2015/16 compared to 2014/15, 2014/15 compared to 2013/14, and 2013/14 compared to 2012/13.

Findings

Figure 3.9 compares the impact of month of birth with the year before.

FIGURE 3.9: RELATIONSHIP BETWEEN MONTH OF BIRTH AND FSM PUPILS’ EYFSP PERFORMANCE, YEARS COMPARED



Source: EIF

The results show no overall positive relationship between being born later on the 2015/16 FSM pupils’ EYFSP attainment compared to the 2014/15 results. While there are some months where 2015/16 FSM children appear to perform better than children born in the same month the year before, there is no consistent trend and the variation over the year seems comparable to the variation seen in previous years. The most sustained impact is seen for children born in July and August. However, to be convinced that this is reflective of the impact of additional childcare, we would need to see this impact extended to children born from April onwards.

Discussion

The fact that we see no impact in the first year is perhaps not surprising. Some children may have already been receiving up to 10 hours of childcare under the pre-existing arrangements for 2-year-olds prior to 2013. However, for all children that took up the offer this would have represented an increase in the amount of childcare they otherwise would have received (in terms of hours), and due to the limited number of 2-year-old places funded prior to September 2013, there would have been an overall increase in the number of FSM children eligible to receive some childcare at the age of 2.

The analysis in this section is a form of ‘intention-to-treat’ (ITT) design. It intentionally includes all pupils that could have benefited from the childcare offer – it does not look solely at those that took it up. This is helpful as it avoids all the potentially unobserved biases associated with looking at just those children who took up the offer. However, one limitation of this approach is that any effect from receiving childcare could be masked by differences in the same factors which drive take-up.

Overall, the results can only suggest there was no obvious association between additional terms’ worth of entitlement and overall performance. The results cannot definitively show whether there was an effect or not. Given the low and variable take-up of the 2-year-old entitlement across the first year, the finding of no impact should be interpreted with caution. It is important to see whether or not later waves have seen any improvements, which we do in method 2.

Method 2: Local authority-level changes in take-up and attainment

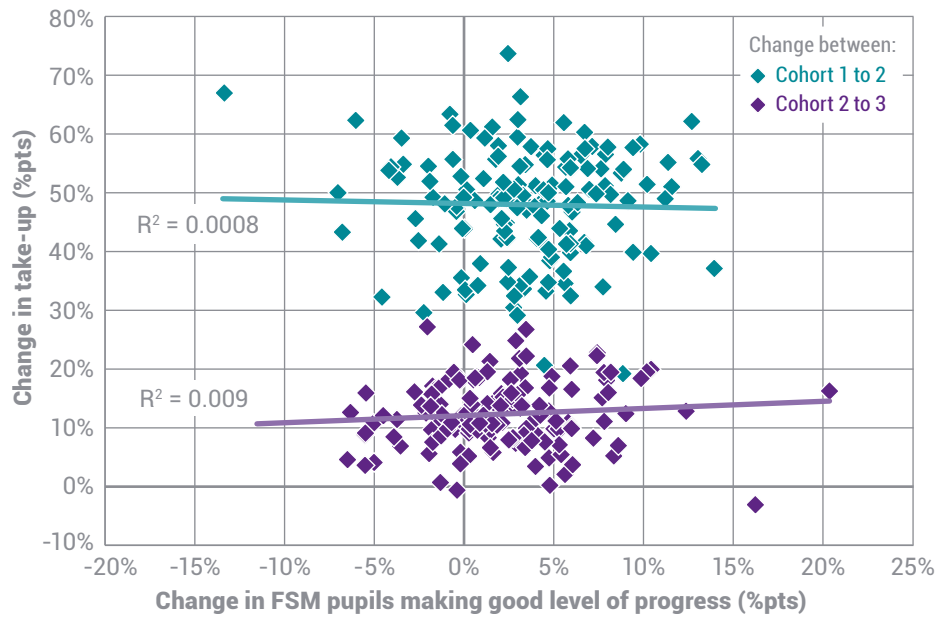
In the second approach, we look to see how changes in EYFSP results have varied at the local authority level in line with changes in take-up of the 2-year-old offer. If there is an effect of the offer, we’d expect to find a positive relationship between higher rates of take-up and improvements in EYFSP results. We do this for the first two cohorts of eligible children who we have EYFSP results for in 2015/16 and 2016/17. We also include results for children who would have been aged 2 the year before rollout, where take-up has effectively been set to zero across all local authorities. Again, we have no data on the number of children that took up the pre-existing funding for 2-year-old places prior to September 2013. For simplicity, table 3.2 summarises the three cohorts of children used. We limit the analysis to just children born in January to August, to ensure we can include comparable data across all three cohorts.

TABLE 3.2: COHORTS OF CHILDREN INCLUDED

Cohort	Year children aged 2	Year children’s EYFSP results reported
Cohort 1	2012/13 (year before rollout)	2014/15
Cohort 2	2013/14 (1st year of rollout)	2015/16
Cohort 3	2014/15 (2nd year of rollout)	2016/17

Figure 3.10 shows the relationship between changes in take-up among FSM pupils and changes in the proportion of FSM pupils achieving a good level of development.

FIGURE 3.10: RELATIONSHIP BETWEEN LOCAL AUTHORITY TAKE-UP AND CHANGE IN PUPIL PROGRESS



Source: EIF

Descriptively, the chart shows there is little relationship between increases in take-up and increases in EYFSP performance at the local authority level for the first two cohorts of eligible children. However, simply drawing a relationship between changes in take-up and EYFSP performance masks individual local authority-level factors that could drive both take-up and performance.

Method

To test the relationship more formally, we use ‘fixed effect’ models. Fixed effect models allow us to test how changes in EYFSP performance varies over time within local authorities (LAs), relative to other factors, such as changes in take-up, that also vary between years. Such models control for the influence of all other local authority-specific factors that might influence attainment and take-up, but that do not vary from year to year (for example, unobserved local differences in provider quality). Annex 2b contains the full model specification. We include several control variables that did vary over time at the LA level and for each cohort of FSM children. Controls are included for the proportion of pupils in each LA and cohort that:

- took-up free childcare aged 2
- took-up free childcare aged 3
- were FSM eligible
- for whom English was an additional language
- were White British
- received SEN support in Reception
- were male
- were born in the spring term.

We need to be careful of the fact that both EYFSP results and take-up have been increasing over time. As these are both trending variables, we could wrongly attribute changes to EYFSP performance to improvements in take-up. We control for this in two ways: first, by adding an overall national trend term in all the models; and second, by allowing in some model specifications for local authority

specific trends, reflecting the fact that trend growth in attainment in individual local authorities may vary.

Findings

The full results are presented in annex 2b. Table 3.3 shows the main estimates for the impact of 2-year-old take-up on FSM pupils' EYFSP performance. The results show that in the first year of rollout (comparing cohorts 1 and 2), there was no statistically significant relationship between changes in take-up and FSM pupil's later EYFSP performance.

In the second year of rollout (comparing cohorts 2 and 3) there is a statistically significant relationship between take-up and increases in attainment. For every 1 percentage point increase in take-up there was an increase of 0.13 percentage points in the proportion of pupils achieving a good level of development. However, this relationship is not highly significant, so should be treated with caution.

TABLE 3.3: IMPACT OF 2-YEAR-OLD TAKE-UP ON EYFSP RESULTS FOR FSM CHILDREN

Model	Cohorts included	LA-specific time trend?	Central estimate	95% confidence interval	
				Low	High
M1	1 & 2	No	0.030	-0.049	0.108
M2	2 & 3	No	0.126*	-0.005	0.257
M3	1, 2 & 3	No	0.036***	0.009	0.063
M4	1, 2 & 3	Yes	0.063***	0.024	0.103

* p<0.10, ** p<0.05, *** p<0.01

Over the period as a whole (including cohorts 1, 2 and 3), where we do not include LA-specific time trends, every 1 percentage point increase in take-up is associated with an increase of 0.04 percentage points in the proportion of FSM pupils achieving a good level of development. Where LA-specific time trends are included, every 1 percentage point increase in take-up is associated with an increase of 0.06 percentage points in the proportion of FSM pupils achieving a good level of development. To put this into context, the average proportion of FSM pupils at the LA level that achieved a good level of development increased by 6 percentage points between 2014/15 and 2016/17. Our lower estimate suggests take-up explains around one-third of this increase.¹⁹

To test the rigour of these finding, we also rerun the analysis, testing the impact of take-up on non-FSM attainment. We would expect to see no relationship or a much smaller relationship between changes in 2-year-old take-up among FSM pupils and non-FSM attainment. Again, the full output is reported in annex 2b and the summary findings are presented in table 3.4.

¹⁹ By the second year of implementation an average of 60% of FSM children had taken up the offer. Multiplying our lower estimate of 0.04 percentage points by 60% suggests increases in take-up over the period would have led to an increase in attainment of 0.2 percentage points, holding all other things constant. This is around one-third of the 6 percentage point increase actually observed.

TABLE 3.4: IMPACT OF 2-YEAR-OLD TAKE-UP ON EYFSP RESULTS FOR NON-FSM CHILDREN

Model	Cohorts included	LA-specific time trend?	Central estimate	95% confidence interval	
				Low	High
M5	1 & 2	No	-0.038*	-0.076	0.001
M6	2 & 3	No	-0.016	-0.068	0.035
M7	1, 2 & 3	No	0.016**	0.001	0.031
M8	1, 2 & 3	Yes	0.043***	0.024	0.062

* p<0.10, ** p<0.05, *** p<0.01

Table 3.4 shows that, over the period as a whole, we do find a relationship between increased take-up and non-FSM EYFSP performance. The results show, where we do not include LA-specific time trends, every 1 percentage point increase in 2-year-old childcare take-up is associated with an increase of 0.02 percentage points in the proportion of non-FSM pupils achieving a good level of development. This is around half the effect found for FSM attainment. That we do find a positive relationship between FSM take-up and non-FSM attainment is interesting. This may be explained by a number of things, including the expansion of the 2-year-old criteria from 2014/15 to children from higher-income households who did not meet the FSM criteria. As non-FSM and FSM take-up are correlated (as set-out in figure 2.1), this might explain the relationship found.

Discussion

This section has shown that over the first two years of implementation there has been some association between increases in 2-year-old childcare take-up among FSM children and increases in FSM attainment at the local authority level. For every 1 percentage point increase in take-up, the proportion of pupils achieving a good level of development is found to have increased by between 0.04 percentage points and 0.06 percentage points. Given the changes in attainment and take-up over the period, this accounts for around one-third of the overall increase in FSM attainment seen between 2013/14 and 2015/16.

However, it's important to bear in mind that improvements in FSM pupils' EYFSP performance have been fairly modest over the past two years, compared to recent trends. The proportion of FSM pupils at the local authority level achieving a good level of development increased from around 52% in 2014/15 to 57% in 2016/17. As section 3.2 showed, this is below the trend growth in attainment for FSM children seen in the preceding years. The introduction of the 2-year-old entitlement from 2013 represented an expansion on the pre-existing funding for disadvantaged 2-year-olds. Therefore, the expansion of funding for 2-year-olds cannot be shown to have had a dramatic impact on measured EYFSP performance.

The main limitation of this approach is we have no data on take-up of childcare aged 2, in the year before September 2013. It is likely to have been below the level of provision in the years following the introduction of the national entitlement. By assuming take-up was effectively zero in 2012/13 across all local authorities, we are likely to underestimate the impact of increases in take-up on attainment the following year.

3.4 Conclusions and recommendations

The introduction of the 2-year-old entitlement from September 2013 represented an expansion on the amount of childcare on offer to disadvantaged households. Holding all things constant, we'd expect to see an improvement in early years outcomes of disadvantaged children in the past few years. There have been improvements in the FSM-EYFSP results and the gap to non-FSM pupils has fallen. However, the rate of progress has declined in the past two years, in which the impact of expanding childcare for 2-year-olds should first have been observed. Although there are weaknesses in the EYFSP as a measure of pupil progress, it is nevertheless the government's main national measure of pupil progress in the early years. At an aggregate level there is little evidence to suggest the introduction of the 2-year-old offer has been associated with a substantial decrease in the social gradient on assessed ability at the end of the Reception year.

However, when we look at a subnational level we do see a small positive association between take-up of the expanded offer and performance of FSM children in the EYFSP. Overall our analysis indicates that the 2-year-old entitlement does have the potential to make some impact on the gap between FSM pupils' performance at the end of Reception and their more advantaged peers, and that take-up of the offer is important. However, given the relatively small impacts seen so far it is important that DfE keeps this under review to ensure it is successful in pursuing its overall policy aim of reducing the gap for disadvantaged pupils.

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Annex 1: Methodology

Main data sources

Estimating take-up, and later matching to early years attainment, requires merging three main DfE datasets, accessed via the National Pupil Database (NPD). These were:

- the early years census (academic years 2012/13 to 2016/17)
- the January schools census (academic years 2012/13 to 2016/17)
- the Early Years Foundation Stage Profile (EYFSP) (academic years 2012/13 to 2016/17).

The **early years census** is a once-yearly census of pupils attending private, voluntary and independent (PVI) school providers, at January of each academic year. Pupil-level records are made for all children receiving a government-funded early years place in a PVI setting. Data is collected on pupil's basic background characteristics (their location, ethnicity, gender), the number of hours of childcare they received in each setting attended, and some information on the providers attended (type of setting, qualifications of staff).

The **school census** holds pupil-level records for all pupils attending a maintained provider (that is, a school or maintained nursery). This includes pupils taking up government-funded childcare as well as pupils in the Reception year and older in maintained schools. Although the school census is completed termly, we requested data only from the January census in order to maintain consistency with the data available from the early years census. Furthermore, we limited our data request to pupils who were either in a Nursery or Reception class at the time of the census. Similar to the early years census, the school census records basic pupil background information (such as location, ethnicity, and so on) as well as additional information, such as whether they were registered as being free school meals (FSM) eligible at the time of the census.

The **Early Years Foundation Stage Profile (EYFSP)** is completed in the final term of the year in which children reach age 5, which typically means at the end of Reception. Individual records are collected on pupil's performance against each of the 17 early learning goals (ELGs).

Method of estimating take-up

In order to estimate take-up, we first need to identify the total number of children that could have taken up the offer. For this, we use the total list of children who appear in the school census within the Reception year. Within this group we use children's FSM status in Reception to further isolate those children likely to have met part of the economic criteria for entitlement to the 2-year-old offer. Strictly speaking we use the 'Ever6' definition of FSM eligibility, used to determine entitlement for the pupil premium. This essentially means we classify children as FSM eligible if they were identified as meeting the FSM criteria in either of the October or January school censuses.

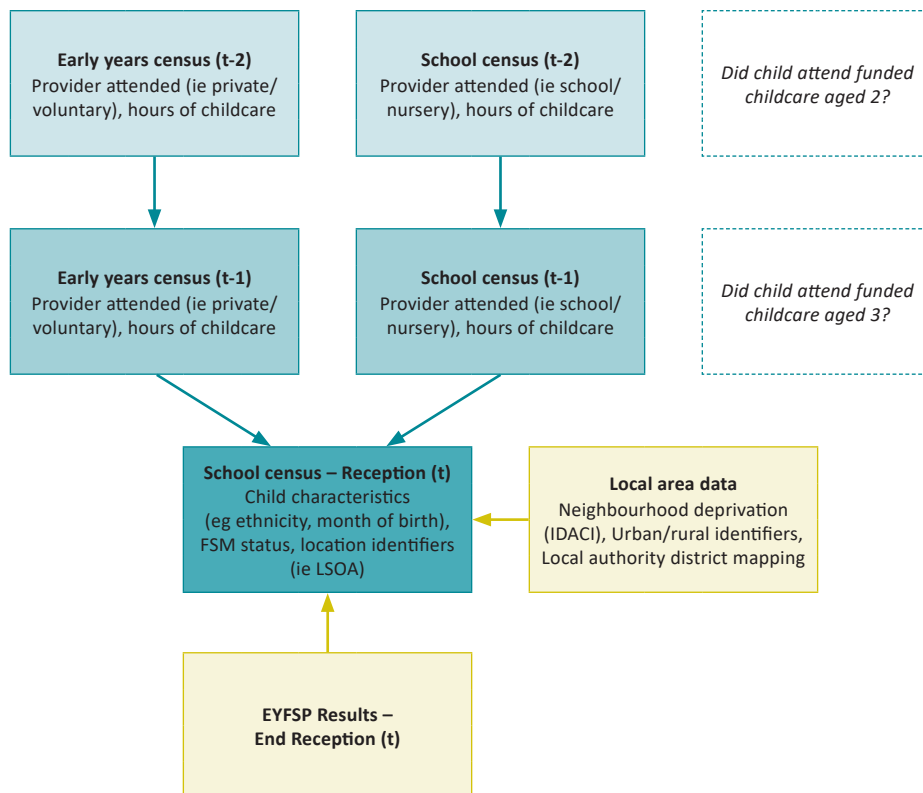
Using the complete list of pupils in Reception in maintained schools in the January census, we match individual children to previous years of the early years and school censuses to identify whether they attended when they were aged 2 and were thus taking up a funded place. For the same children, we also capture data

on whether they attended childcare aged 3. Children are matched between years using their unique anonymised pupil reference number, provided within the NPD. All data relating to the child (ethnicity, location, date-of-birth etc) is taken from the point they were in Reception.

Some additional data is matched to pupils, outside of that provided through the NPD. This includes, local neighbourhood measures of deprivation (IDACI), relative sparsity of the area in which the child lives (measured by simple ONS classifications for urban/rural neighbourhoods) and other geographic information not contained in the NPD. These are all matched using the Lower Super Output Area (LSOA) of the pupil's home address in Reception. LSOA's are low-level geographic units in which pupils reside. They are constructed by the ONS and include between 400–1,200 households.

The following diagram provides a simplified overview of how the dataset is constructed for each cohort of pupils.

FIGURE A.1: COMBINING DATASETS



Annex 2a: Attainment results – Month of birth

TABLE A1: LOGISTIC REGRESSION: ODDS OF FSM PUPILS ACHIEVING A GOOD LEVEL OF PROGRESS

	2015 vs 2014	2014 vs 2013	2013 vs 2012
	M1	M2	M3
Child & household characteristics			
Ethnicity (non-White British compared to White British)			
<i>Non-EAL</i>	1.129***	1.104***	1.107***
<i>EAL</i>	0.966**	0.916***	0.882***
<i>Missing</i> [†]	1.016	1.005	0.991
Male (vs female)	0.529***	0.531***	0.541***
SEN (vs non-SEN)	0.161***	0.171***	0.179***
Local area characteristics			
IDACI (2015)	1.759***	1.495***	1.696***
LAD: FSM rate (Reception)	0.764***	0.687***	0.608***
London (vs non-London)	1.460***	1.474***	1.447***
Impact of month of birth (compared to September)			
October	0.916**	0.883***	0.919**
November	0.784***	0.749***	0.806***
December	0.708***	0.690***	0.710***
January	0.604***	0.592***	0.617***
February	0.549***	0.540***	0.563***
March	0.491***	0.480***	0.487***
April	0.429***	0.427***	0.447***
May	0.371***	0.371***	0.386***
June	0.329***	0.331***	0.326***
July	0.271***	0.279***	0.280***
August	0.230***	0.235***	0.253***
Impact of month of birth (compared to same month the year before)			
September	1.182***	1.352***	1.536***
October	1.136***	1.402***	1.477***
November	1.153***	1.416***	1.429***
December	1.146***	1.389***	1.495***
January	1.149***	1.384***	1.477***
February	1.214***	1.377***	1.477***

March	1.144***	1.386***	1.518***
April	1.145***	1.362***	1.472***
May	1.160***	1.355***	1.482***
June	1.143***	1.347***	1.564***
July	1.210***	1.318***	1.537***
August	1.240***	1.327***	1.434***
Observations	203,726	217,912	199,667
Pseudo R-squared	0.114	0.109	0.105*

† Includes all pupils where either ethnicity or primary language spoken at home were not known or not reported. This also includes the small number of pupils recorded as White British and where English was not the primary language spoken at home.
p<0.10, ** p<0.05, *** p<0.01

Annex 2b: Attainment results – Local authority panel

TABLE A2: CHANGE IN THE PROPORTION OF FSM PUPILS ACHIEVING A GOOD LEVEL OF DEVELOPMENT²⁰

	2012–2013	2013–2014	2012–2014	2012–2014
	M1	M2	M3	M4
FSM take-up of 2 y/o offer	0.030 [0.040]	0.126* [0.066]	0.036*** [0.014]	0.063*** [0.020]
Take-up of 3 y/o offer, <i>FSM pupils</i>	0.094 [0.220]	0.064 [0.157]	0.088 [0.137]	0.099 [0.236]
LA-level FSM rate	-0.110 [0.132]	-0.103 [0.168]	-0.104 [0.086]	-0.140 [0.178]
EAL (%) <i>FSM pupils</i>	0.001 [0.022]	0.016 [0.019]	0.029** [0.012]	-0.033 [0.031]
White British (%) <i>FSM pupils</i>	0.206** [0.096]	0.165* [0.100]	0.177*** [0.063]	0.161 [0.127]
SEN (%) <i>FSM pupils</i>	-0.410*** [0.143]	-0.499*** [0.162]	-0.447*** [0.104]	-0.522** [0.211]
Male (%) <i>FSM pupils</i>	0.088 [0.085]	-0.150** [0.074]	-0.043 [0.063]	-0.017 [0.098]
Spring term (%) <i>FSM pupils</i>	0.241** [0.093]	0.128 [0.085]	0.158*** [0.060]	0.190* [0.099]
Time trend	0.019 [0.020]	0.002 [0.008]	0.015*** [0.004]	0.011 [0.010]
LA-specific time trend included?	No	No	No	Yes
Constant	0.13 [0.220]	0.355** [0.178]	0.258* [0.143]	0.28 [0.250]
Observations	298	298	447	447
R-squared (within)	0.515	0.378	0.552	0.816
R-squared (overall)	0.112	0.150	0.046	0.014

Note: Standard errors in brackets.

* p<0.10, ** p<0.05, *** p<0.01

²⁰ City of London, Isle of Man and Rutland have been excluded from the analysis because they are too small.

**TABLE A3: CHANGE IN THE PROPORTION OF NON-FSM PUPILS
ACHIEVING A GOOD LEVEL OF DEVELOPMENT**

	2012–2013	2013–2014	2012–2014	2012–2014
	M5	M6	M7	M8
FSM take-up of 2 y/o offer	-0.038* [0.019]	-0.02 [0.026]	0.016** [0.007]	0.043*** [0.010]
Take-up of 3 y/o offer, <i>FSM pupils</i>	0.23 [0.183]	-0.11 [0.105]	-0.11 [0.111]	0.14 [0.122]
LA-level FSM rate	-0.01 [0.086]	0.02 [0.066]	-0.05 [0.058]	-0.02 [0.097]
EAL (%) <i>FSM pupils</i>	0 [0.011]	0 [0.009]	0.015** [0.008]	-0.02 [0.015]
White British (%) <i>FSM pupils</i>	0.04 [0.094]	-0.01 [0.098]	0.02 [0.072]	-0.03 [0.122]
SEN (%) <i>FSM pupils</i>	-0.300* [0.160]	-0.216* [0.113]	-0.248** [0.114]	-0.17 [0.161]
Male (%) <i>FSM pupils</i>	-0.09 [0.099]	-0.219*** [0.074]	-0.169** [0.077]	-0.12 [0.093]
Spring term (%) <i>FSM pupils</i>	0.07 [0.115]	-0.01 [0.066]	-0.03 [0.072]	-0.01 [0.099]
Time trend	0.050*** [0.010]	0.017*** [0.004]	0.019*** [0.003]	0.000 [0.004]
LA-specific time trend included?	No	No	No	Yes
Constant	0.384* [0.206]	0.886*** [0.122]	0.835*** [0.128]	0.616*** [0.144]
Observations	298	298	447	447
R-squared (within)	0.700	0.548	0.712	0.926
R-squared (overall)	0.084	0.051	0.216	0.019

Standard errors in brackets

* p<0.10, ** p<0.05, *** p<0.01