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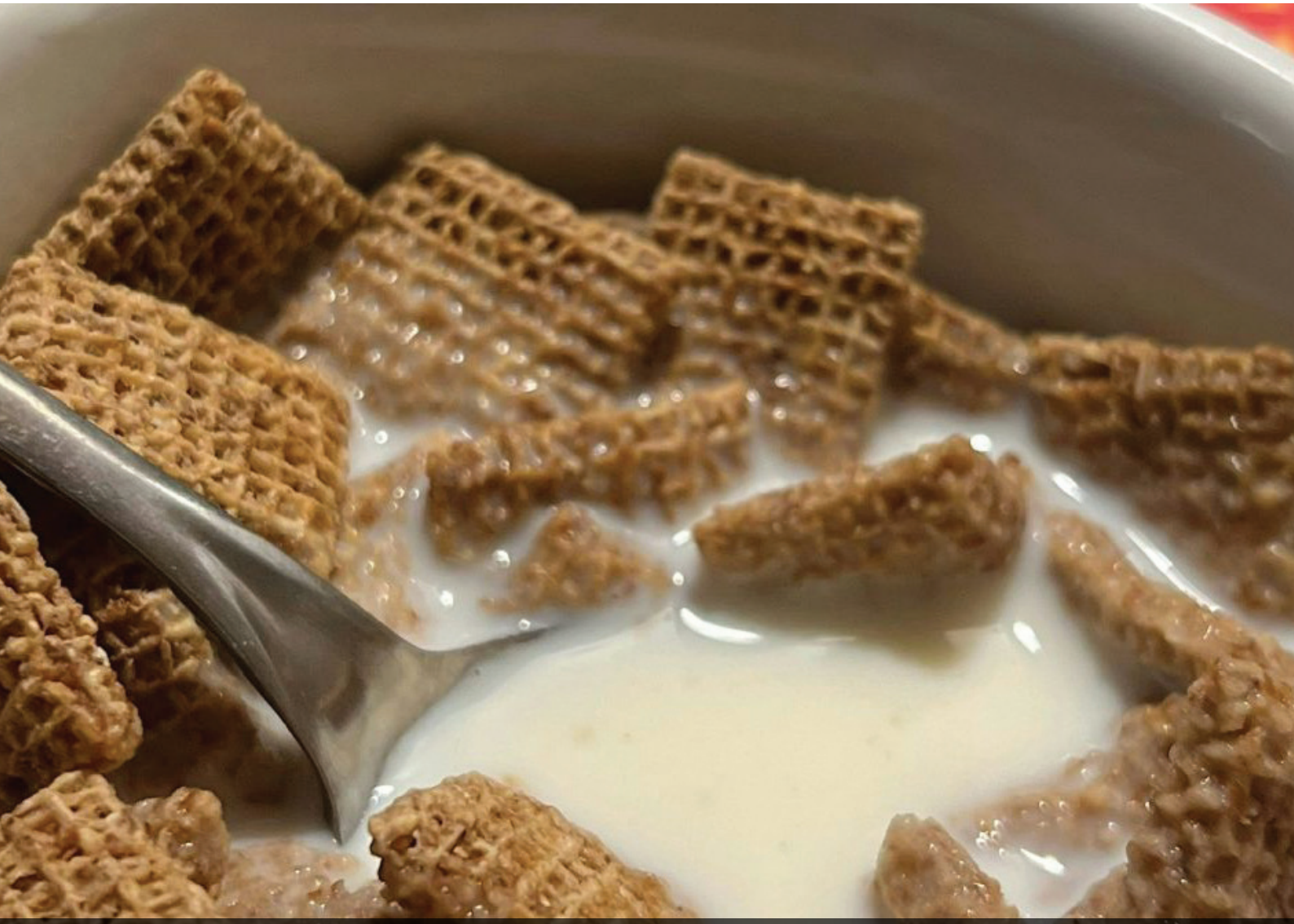

Impact of school breakfast programmes in primary schools in England

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Summary

Free universal breakfast schemes have operated in disadvantaged primary schools in England for at least 30 years, funded by charities and, from 2018/19, the National School Breakfast Programme. Since early 2025, the government has been rolling out before-school Breakfast Clubs to all primary pupils, prioritising schools with disadvantaged intakes in the first instance.

This report investigates free breakfast schemes run by three major providers - Magic Breakfast, the Greggs Foundation, and the National School Breakfast Programme - using secondary data from 2006 to 2024, with the aim of informing the national roll-out of breakfast clubs in England. We describe how the schemes were rolled out, how they were delivered, and how many children took them up. We then evaluate their impact on:

- Absences and punctuality
- Child development and educational attainment
- Children's bodyweight
- Child emotional and behavioural difficulties
- Families' subjective financial situation and food expenditure

Throughout, we examine how impacts vary by provision mode and across different groups of pupils and schools.

Data

- For **school breakfast provision** and take-up, we use school-level data from three major providers: Magic Breakfast, the Greggs Foundation, and the National School Breakfast Programme (NSBP). Using school codes, we link these data to secondary data appropriate to each outcome:
- For **absences, persistent absence**, and **punctuality**, we use individual-level counts of half-day absences by reason from the National Pupil Database (NPD).
- For educational attainment, we use teacher-assessed **Foundation Stage Profile** (EYFSP) scores and **Key Stage** 2 (KS2) **Reading and Maths** results from the NPD.
- For **BMI classifications** and **obesity prevalence**, we use school-level data from the National Child Measurement Programme (NCMP).
- For **emotional and behavioural difficulties**, as well as **subjective financial situation** and **food expenditure**, we use Understanding Society, the UK Household Longitudinal Study (UKHLS).

Methods

All results use a staggered difference-in-difference design, comparing changes in outcomes between schools that have and have not yet adopted a free breakfast scheme. This identifies the causal impact of the policy under the assumption that, without the scheme, outcomes in treated schools would have followed the same trajectory as in control schools. To strengthen this assumption, we restrict the sample to schools that are known to have offered free breakfast at some point, so comparisons are always between earlier and later adopters rather than between adopters and schools that never participated.

Treatment effects are estimated using the imputation estimator of Borusyak et al. (2024), which uses not-yet-treated schools to predict counterfactual outcomes and compares these to observed outcomes after treatment.

All estimates are intention-to-treat (ITT), reflecting the effect of breakfast being available in a school rather than the effect of individual take-up.

Main results

Provision mode and take-up:

- Breakfast schemes are delivered as **Breakfast Clubs** (typically in school halls before the school day), **Classroom** provision (during arrival time in the classroom), **Grab and Go** (available to take while passing through the school or playground), or a combination of these (**Mixed** provision).
- Breakfast Clubs were the dominant delivery mode before the pandemic. Classroom, Grab and Go, and Mixed provision expanded mainly in the post-pandemic period.
- Take-up is highest in Classroom provision (84%), followed by Grab and Go and Mixed, and lowest in Breakfast Clubs (28%). The share of FSM-eligible children among participants is similar across all modes, at around 49%.

Absences and punctuality:

- Breakfast schemes **reduced absence by 0.07 percentage points**, equivalent to about 0.13 fewer days per child per year, or roughly 30 fewer days of absence spread across an entire 240-pupil school over a full year.
- **Persistent absence fell by 0.3 percentage points** (2.5% of the 12% baseline), equivalent to fewer than one child per school per year moving out of persistent absence. These effects are statistically detectable but likely too small to matter in practice.

Child development and attainment:

- Breakfast schemes **improved EYFSP scores** at age 5 across most domains **by about 0.3 percentiles**, meaning that in a ranking among 1000 Reception children, a child exposed to a free breakfast scheme would move up by just three places. This is unlikely to be of practical significance on its own. Benefits were roughly three times larger under Mixed provision (~1 percentile) and more pronounced for White than ethnic-minority pupils.
- Breakfast schemes **improved KS2 Reading by 2.2% and Maths by 1.7% of a standard deviation** per child by the end of primary school (age 11). This is about one extra week of progress, and roughly half the effect we previously found for Universal Free School Meals (a larger meal reaching all children). Effects were largest under Mixed

provision, larger for Black pupils, and larger for non-FSM-eligible children in disadvantaged schools, who have no access to a free lunch.

Children's bodyweight:

- Breakfast schemes **raised obesity prevalence by 0.25 percentage points in Reception and 0.36 in Year 6** (about 2% and 1.4% above baseline means). This is equivalent to roughly one additional child living with obesity for every 400 children in Reception and every 280 in Year 6, and about half the size of the beneficial bodyweight effect of Universal Free School Meals.
- Detrimental effects were driven by Classroom provision, while Breakfast Clubs, Mixed and Grab-and-Go showed no significant increase in obesity prevalence. Breakfast Clubs did however raise BMI among Year 6 children by 1.7% of a standard deviation.

Children's emotional and behavioural difficulties:

- Breakfast schemes **reduced emotional and behavioural difficulties by 1.5 points** on the 0–40 SDQ Total Difficulties scale, which is 22% of a standard deviation, or a 14% fall from the sample mean of 10.2. This is equivalent to about one and a half of the twenty difficulty items being rated a level lower (for example, "easily distracted" or "often loses temper" shifting from "certainly true" to "somewhat true"), and is among the larger effects in the distribution of English education-trial results, comparable to dedicated whole-school wellbeing programmes.
- The benefit was concentrated entirely in boys, who showed a 3-point improvement (about three items rated a level lower, or 0.44 of a standard deviation) driven by reduced hyperactivity and conduct problems. Effects did not differ by FSM eligibility.

Families' subjective financial situation and food expenditure

- Breakfast schemes **do not affect mothers' and fathers' subjective financial situation or family expenditure on groceries or takeaways.**

Implications for policy and practice

- **Take-up** of Breakfast Clubs is low: fewer than one in three children attend, despite provision being free. Before-school clubs require families to change their morning routine and are likely used disproportionately by working households for whom the childcare element is most valuable. The national programme should invest in reducing barriers to participation, particularly for families not in work, who may benefit most nutritionally but have least incentive to bring children in early. This could be done through communication with families, flexible start times, and targeted outreach to the most disadvantaged households.
- Policymakers should not expect breakfast schemes to deliver meaningful reductions in **absence** or persistent absenteeism. Effects on attendance are statistically detectable but too small to be of practical significance.
- Free breakfast schemes in disadvantaged schools raise children's **educational progress** in Reading and Maths by a modest but meaningful amount by the end of primary school, suggesting that breakfast schemes can form part of a wider policy toolkit for raising attainment among disadvantaged pupils.
- Programmes should be understood as benefiting a broad range of children in **disadvantaged schools**, not only those eligible for free school meals. Attainment gains are largest for non-FSM-eligible children in disadvantaged schools who do not receive a free lunch and may rely more on breakfast for their nutritional intake during the school day and for Black pupils at age 11. Targeting and prioritisation of provision in the most deprived schools remains well-founded on both nutritional and educational grounds. Less is known about what impact will be in less disadvantaged schools.
- The adverse effects on children's **bodyweight** are a concern and should not be dismissed. Breakfast schemes increase obesity prevalence in both Reception and Year 6 on average. These effects are not inevitable: Mixed and Grab and Go provision show no significant adverse bodyweight effects, while Classroom provision, the mode with the highest take-up, produces the largest increases, consistent with breakfast becoming a social default regardless of whether children have already eaten at home. While Breakfast Clubs have no statistically detectable effect on children's obesity rates, they do increase BMI among students in Year 6. Delivery models should be designed to reach children with genuine nutritional need without promoting over-consumption.
- The government's planned revision of **school food standards** which clarifies the standards for breakfast is welcome, but standards alone will be insufficient. Effective implementation requires monitoring of compliance and investment in staff training, particularly where breakfast is delivered by non-catering staff in classrooms or on the go.
- Breakfast schemes lead to significant improvements of children's **emotional and behavioural difficulties**, especially hyperactivity and conduct problems, with benefits concentrated wholly on boys. Breakfast provision may be a useful complement to dedicated behavioural interventions in schools, which are expensive and hard to scale, though a formal cost-effectiveness comparison is beyond the scope of this study. Girls do not show equivalent direct wellbeing gains; though they may benefit indirectly through a calmer classroom environment, given that KS2 improvements were seen amongst girls as well as boys.

- Evidence on **modes of breakfast provision** shows that Mixed provision, which offers children a choice of how to access breakfast, consistently outperforms a single delivery mode across attainment, development, and bodyweight outcomes. The government should consider whether the national Breakfast Club programme can accommodate flexibility in delivery within schools, rather than prescribing a uniform before-school format.
- A key evidence gap is the absence of individual-level **take-up data** linked to children's outcomes. Providers and the government should prioritise collecting attendance data that can be matched to administrative records. This would, for example, allow researchers to establish whether the larger educational impacts at age 11 than age 5 reflect higher take-up among older children, or whether nutrition and the altered classroom environment have a greater effect on older children's learning.

Full report: Impact of school breakfast programmes in primary schools in England

1 Introduction

School breakfast schemes have been delivered in England through a number of initiatives and charities for at least 30 years, mostly in schools that serve disadvantaged populations. In addition, since 2018, the National School Breakfast Programme has subsidized breakfast in schools with a high proportion of pupils from deprived neighbourhoods. More recently, the government is rolling out universal breakfast provision in the form of Breakfast Clubs before school, including a childcare element of at least 30 minutes, to all pupils in primary schools in England. 750 Early Adopter schools began delivering the programme in April 2025, with approximately 500 more joining from April 2026. Evidence on the efficacy of breakfast provision and how this varies across different provision models and children from different backgrounds is therefore very timely.

School breakfast schemes have the potential to address several pressing policy problems at relatively low cost. They may alleviate hunger among the rising number of school children going hungry in the cost-of-living crisis and thereby improve children's mental health, behaviour, educational attainment and school attendance, all of which have declined compared with before the pandemic (e.g. Andrews, 2023; Lester and Michelson, 2024). Schemes delivered as before-school clubs may also remove a barrier to parents of young children (re-)entering the labour force or increasing their working hours by combining breakfast and childcare provision.

The main existing evidence about the impact of school breakfast schemes in England comes from Education Endowment Foundation (EEF) evaluation of Magic Breakfast (MB, Crawford et al., 2019). The intervention comprised an unlimited supply of breakfast foods, £300 capital grant, and access to an MB 'change leader'. The authors compare outcomes of children in a group of schools that received MB during the 2014/15 academic year with outcomes of children in a group of similar schools that had also applied for MB and would receive it the following year. They found that breakfast consumption was shifted from home to school for around 15% of pupils and led to approximately 2 months' additional progress in Maths, Reading and Writing at age 7; slightly smaller and statistically insignificant impacts at age 11; small reductions in absence and late arrivals at school; improved teacher perceptions of behaviour and concentration; and no statistically significant impact on bodyweight outcomes in participating schools.

Further UK evidence comes from the evaluation of the pilot Primary School Free Breakfast Initiative implemented in 2004-2005 in Wales, which funded the offer of a free healthy breakfast (involving milk, cereal, fruit and bread) before school each day. Murphy et al., (2010) and Moore et al., (2013) find this led to small improvements in the socioeconomic gap in nutritional intake at breakfast time, but no impact on memory or classroom behaviour.

This study revisits the outcomes examined in previous research - absence, attainment, and bodyweight - while extending the evidence in several ways. We assess impacts over a longer and more recent time-period, including the post-pandemic years and the cost-of-living crisis, and apply a staggered difference-in-difference design that exploits variation in the timing of scheme adoption across a large number of schools. We also cover a broader range of outcomes, including emotional and behavioural difficulties, persistent absenteeism, and parents' financial situation and food expenditure. Finally, and importantly given the government's current rollout, we distinguish impacts by mode of provision, an aspect of breakfast schemes that has not previously been examined systematically.

The report is structured as follows. We first describe the roll-out of free breakfast schemes in disadvantaged schools in England, the modes of provision, and the characteristics of participating schools and pupils. We then describe take-up before evaluating the impact of schemes on:

- Children's absences, persistent absenteeism, and punctuality (ages 5–11)
- Child development at age 5 and attainment at age 11
- Emotional and behavioural difficulties (ages 5, 8, 10-11)
- Bodyweight (BMI, overweight, obesity) in Reception and Year 6
- Parents' perceived financial situation and food expenditure

Throughout, we examine whether impacts vary by provision mode (Breakfast Club, Grab and Go, Classroom, or Mixed), pupil background (gender, ethnicity, FSM eligibility), and school characteristics (deprivation and FSM rates).

2 Data and methods

Data

We use a variety of existing secondary data sources:

- **School breakfast provision** data were obtained from three major providers: Magic Breakfast, the Greggs Foundation, and the National School Breakfast Programme (NSBP), which together cover 16.5% of schools in England and roughly 60% of all schools with free breakfast provision[1]. Data are available from 2006/07 to 2023/24, excluding 2020/21. We harmonise records across providers to code each school's main mode of provision, distinguishing Breakfast Club/Hall-based, Classroom, Grab and Go, Mixed, and Other. Take-up rates are calculated using school-level survey data collected by one provider.
- **Absences and punctuality** are measured using termly NPD data from 2006/07-2018/19 and 2021/22–2023/24, covering children in Years 1-6 (absence data are not

1 Based on a survey of schools, Magic Breakfast's 'Hidden Hunger' report estimates that 28% of primary schools had a universally accessible free school breakfast club in 2022, indicating that our data covers 60% of schools with free breakfast provision (16.5%/28%). However, this is likely an underestimate, as the Magic Breakfast survey oversampled schools with deprived intakes among whom we expect a higher-than-average breakfast club coverage.

available for Reception). We construct counts of half-day absences by reason. Punctuality is captured by unauthorised absences recorded as arriving after registers close. Persistent absentees are defined as missing more than 10% of sessions in a year.

- **Educational attainment** is measured using NPD data for the same years, omitting the Covid years. For age-5 attainment we use teacher-assessed **Foundation Stage Profile** (EYFSP) scores and subdomains, expressed as percentiles within each cohort. For age-11 attainment we use standardised **Key Stage 2** (KS2) test scores in **Reading** and **Maths**.

  Attainment and absence data are linked to child-level characteristics from the School Census, including age, gender, ethnicity, English as an additional language, free school meal (FSM) eligibility, and IDACI score, as well as school-level measures of disadvantage and area deprivation used by providers to determine eligibility.

- **Children's bodyweight** is measured using school-level data from the **National Child Measurement Programme** (NCMP) for 2007/08-2019/20 and 2021/22-2023/24. The NCMP records height and weight for children in Reception and Year 6, from which we derive BMI z-scores and prevalence of overweight and obesity, defined against the age-and-sex-specific UK 1990 growth charts and using population monitoring thresholds.

- **Emotional and behavioural difficulties** are measured using the UK Household Longitudinal Study (UKHLS, Understanding Society), waves 1-15 (2009-2024), restricted to households with primary-aged children (4-11) and excluding the Covid years. Our main outcomes are drawn from the Strengths and Difficulties Questionnaire (SDQ): parent-reported for children aged 5 and 8, and self-reported for children aged 10 and 11[2]. From the same data we use parents' subjective financial situation and food expenditure (supermarket spending and eating out) as outcomes.

Methods

We exploit the staggered roll-out of free breakfast schemes across schools over time using a difference-in-difference design. The approach compares changes in outcomes between schools that have adopted a scheme and those that have not yet done so, using not-yet-treated schools to approximate what outcomes would have been in treated schools in the absence of the intervention. This relies on the parallel trends assumption: that treated and untreated schools would have followed similar outcome trajectories had treatment not occurred.

To strengthen this assumption, we restrict the sample to schools that have ever offered free breakfast, so that comparisons are always between earlier and later adopters rather than between adopters and schools that never participated. This makes it more likely that we are comparing schools with similar unobservable characteristics, such as headteacher motivation or physical capacity, that would otherwise confound the estimates[3].

We estimate treatment effects using the imputation estimator of Borusyak et al. (2024), which is designed for settings with staggered treatment rollout and potentially heterogeneous treatment effects across school types and over time (Goodman-Bacon, 2021). The estimator uses not-yet-treated schools to predict counterfactual outcomes, then compares these predictions to observed post-treatment outcomes. It has the advantage of accommodating time-varying covariates and drawing on an extended pre- and post-treatment window. We test the parallel trends assumption separately from estimating treatment effects, following Roth (2022).

The way we implement this method and the set of characteristics we can use as control variables differs by the outcomes that we study, owing to the differences in the datasets that we use (administrative vs. survey data, individual-level vs. school-level data), and we detail approaches, parallel trend tests and control variables in the Technical Annex, as well as discussing limitations of our analysis.

Since we observe whether a school offers a free breakfast scheme but not whether individual pupils take it up, all estimates are intention-to-treat (ITT): they capture the effect of a scheme being available in a school, which is the margin most relevant to policymakers. ITT effects represent an average across children who take up the scheme and those who do not, and are therefore smaller than the effect on participating children alone. The relationship between ITT effects and take-up rates matters for interpretation: a small estimated effect could reflect a modest impact spread across many children, a larger impact concentrated among the smaller number who actually participate, or spillover effects on non-participating children through, for example, improvements in classroom behaviour.

2 The SDQ is a validated behavioural and emotional screening tool for children aged 3–16, designed for completion by parents or teachers for younger children and by young people themselves for older ages (Goodman, 2001). Child SDQs are collected annually from wave 3 (2011) onwards, while youth (self-reported) SDQs are collected in alternate waves starting from wave 1 (2009).

3 We also assess whether our results hold when using an alternative control group: schools whose demographic characteristics would make them eligible for the main breakfast scheme providers, even if they never adopted it. Specifically, this includes schools meeting the eligibility thresholds used by providers: Magic Breakfast (more than 35% of pupils eligible for free school meals), the National Breakfast Support Programme (over 40% of pupils living in IDACI bands A–F, or located in the most deprived 37.5% of LSOAs), and Greggs (more than 40% of students eligible for free school meals).

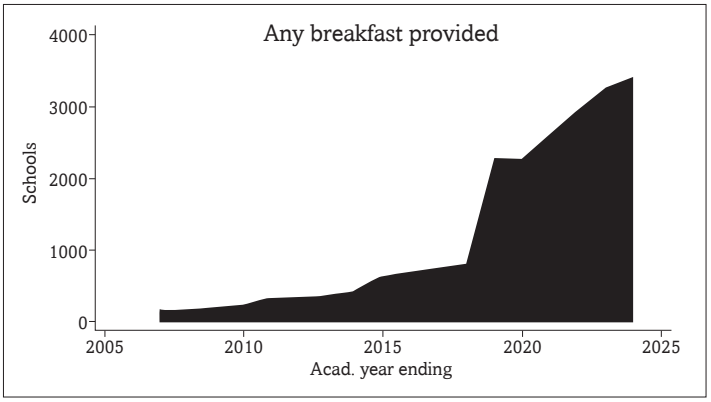
3 Breakfast schemes and provision modes

Many primary schools in England run some form of breakfast programme, ranging from parent-paid clubs to provision that is free for all pupils. This study focuses on free, universal schemes in disadvantaged primary schools, specifically those run by three major providers: Magic Breakfast, the Greggs Foundation, and the National School Breakfast Programme (NSBP), funded by DfE since 2018/19. Unlike the government's current national rollout, these schemes were targeted at schools with disadvantaged pupil populations[4].

Figure 1 shows the roll-out of schemes across England. Provision grew steadily from 2006/07, accelerated sharply in 2018/19 with the introduction of the NSBP, and continued to rise steeply after the pandemic, driven by multiple providers.

Table 1 describes mean school characteristics in the two years before first adoption, by timing of entry. Early adopters (up to 2017/18) served the most disadvantaged populations: they had the highest rates of FSM eligibility, the highest shares of Black, Pakistani, and Bangladeshi pupils and pupils with English as an additional language, and were most likely to be in London, in deprived neighbourhoods, and near unhealthy food outlets. Schools joining in 2018/19–2019/20 and post-pandemic were less disadvantaged on most measures, though post-pandemic were more likely to be above 35% FSM-schools than those joining immediately before. Schools that never participated were the least disadvantaged.

Figure 1 Universal free breakfast provision in England, 2006/07-2023/24



Notes: Number of state-funded primary schools in England with free breakfast provision recorded from Magic Breakfast, Greggs Foundation, or NSBP, 2006/07–2023/24. 2020/21 excluded.

Table 1 Characteristics of participating schools by phase of introduction

	Early	2018/19-2019/20	Post-pandemic	Never
FSM eligible	40.3	24	28.6	19.5
School has >35% FSM eligible	66.3	15.3	28.4	22.1
Black ethnicity	16.5	11.3	9.5	5.2
Indian ethnicity	1.3	2.3	2.2	2.6
Pakistani/Bangladeshi ethnicity	11	8.9	6.7	2.8
Other Non-White-British ethnicity	16.2	17.6	18.0	12.7
English as Additional Language	32.9	27.1	21.6	14.2
Unhealthy outlets per square km	8.7	6.8	6.9	4.2
IDACI percentile	16.7	21.8	27.3	57.8
London	33.3	16.1	12.5	10.9
N	1374	2908	3754	31067

Notes DfE Schools, Pupils and Characteristics datasets, 2007–2024 (excl. 2021); 2011 IDACI percentiles (0=most deprived, 100=least deprived); Food Standards Agency registrations of takeaways, fast food outlets, and convenience stores.

4 Magic Breakfast targets schools with at least 35% of pupils eligible for FSM, Greggs at least 40% FSM eligibility; the National School Breakfast programme is for schools with at least 40% of children living in IDACI bands A-F, the most deprived 35.5% of LSOAs.

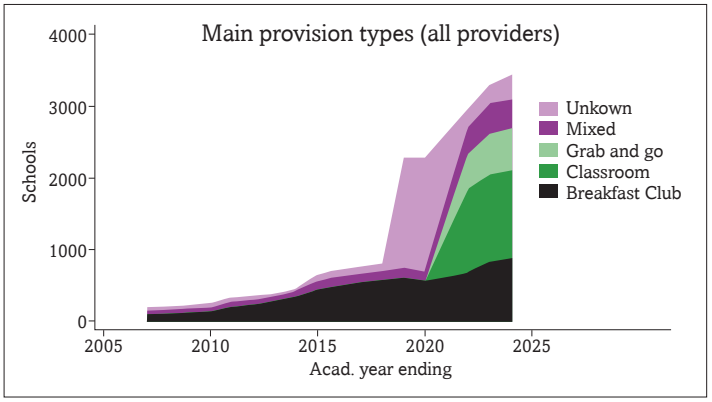
We distinguish four main modes of provision (Figure 2): Breakfast Clubs, often run in school halls before the start of school and therefore most likely containing a childcare element; Classroom provision, usually offered during arrival time in the classroom; and Grab and Go, offered to children to take on the go while passing through the school or playground. In many cases, schools run more than one provision mode. Where more than one mode was used, schools are coded according to their dominant mode (more than 75% of participants), or as Mixed provision where no single mode predominated. A small number of schools could not be classified and are coded as Unknown[5].

Though we cannot observe this in the data, we note that the provision mode will in many cases be related to the food that can be offered to children. Breakfast Clubs run in school halls are more likely (though not certain) to be able to access kitchen facilities and may therefore include hot items such as porridge and a wide variety of serving options. Classroom and Grab and Go might be more restricted in what can be offered, such as toast or bagels, with Grab and Go in turn likely to offer smaller portions. The food offer is one aspect which, together with the childcare element implied in the provision mode, may help understand differences in the impact of breakfast provision, depending on how it is delivered.

Breakfast Clubs were the dominant provision mode for breakfast schemes up to the pandemic. Classroom, Grab and Go, and Mixed provision expanded mainly in the post-pandemic period. This means that estimates by provision mode inevitably capture some time effect, and a post-pandemic effect cannot be fully separated from the effect of provision mode itself.

Table 2 shows school characteristics by current provision mode for the pooled sample. No clear pattern emerges linking particular modes to more or less disadvantaged schools, and differences across modes are modest.

Figure 2 Universal free breakfast provision by mode of provision, 2006/07-2023/24



Notes Number of state-funded primary schools in England by provision mode recorded across Magic Breakfast, Greggs Foundation, or NSBP, 2012/13–2023/24. 2020/21 excluded.

Table 2 Characteristics of participating schools by provision mode

	Breakfast Club/Hall	Classroom	Grab and Go	Mixed	Unknown/ Other	None
FSM eligible	38	41.1	37.4	41.1	31.5	16
School has >35% FSM eligible	56.6	65.6	52.4	67.8	35.7	17.6
Black ethnicity	14.5	10.7	13.3	16.9	13	4.9
Indian ethnicity	1.7	2.6	2.7	1.6	2.2	1.9
Pakistani/Bangladeshi ethnicity	11.5	8.1	7.3	12.2	9	3.3
Other Non-White-British ethnicity	18.9	17.7	20.2	21.1	21.7	9.9
English as Alternative Language	32.6	25.2	28	34.7	28.5	12.6
Unhealthy outlets per square km	9.2	7.8	8.9	9.8	7.6	4.1
IDACI percentile	17.8	23.1	23	17.2	21.5	52.4
London	25	10.6	20.1	32	20.6	11.5
N	7668	3841	1791	2108	3981	314376

Notes DfE Schools, Pupils and Characteristics datasets, 2007–2024 (excl. 2021), linked to provider data on provision modes; 2011 IDACI percentiles (0=most deprived, 100=least deprived); Food Standards Agency registrations of takeaways, fast food outlets, and convenience stores.

5 These data have been harmonized across different providers who used different systems to record activities in their schools. We made a number of assumptions and filled in missing years by forward and backward extrapolation, apart from between before and after the pandemic years. This is because the composition of school breakfast provision modes changed drastically from pre-to-post. In other cases, where data on participation numbers was not available, we made assumptions based on the distribution of participants across modes in multi-mode schools which did have these data available. Specifically, these remaining schools with Breakfast Club and Classroom provision (and no other modes) we code Classroom as the dominant mode, since applying this rule would correctly apply the "75% of participants" threshold 84% of the time. Other combinations (Breakfast Club and Grab and Go; or Classroom and Grab and Go) we coded as mixed, because where we have this data, at least a third of participants took the minority mode on average, and less than half those schools could be definitively coded as dominant in one mode.

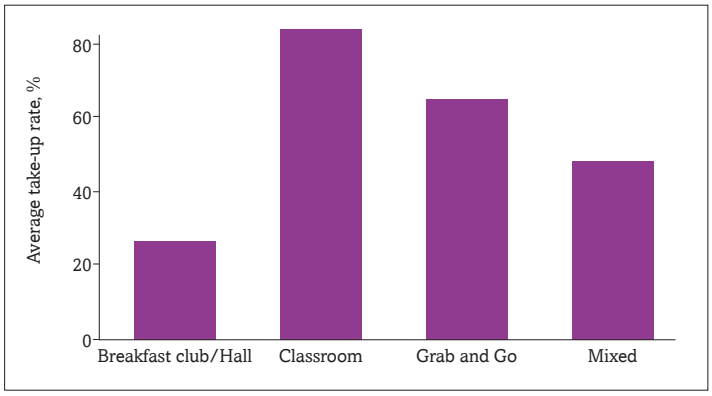
4 Take-up of free breakfast

Understanding take-up is essential for interpreting our ITT estimates, which average effects across children who participate and those who do not. A small ITT effect could reflect a modest impact on many children, a larger impact on the smaller number who actually take up the scheme, or spillover effects on non-participants through, for example, improved classroom behaviour. Take-up rates also help assess whether schemes are reaching the children most likely to benefit.

Take-up data are available from one provider only and are patchy in places[6], so the patterns described here should be treated as indicative rather than representative of all providers and time periods.

Figure 3 shows large differences in take-up by provision mode. Classroom provision reaches 84% of pupils and Grab and Go over 65%, while Mixed provision reaches half (51%). Breakfast Clubs, despite being free, attract fewer than one in three children (28%). Mixed provision is often a combination of Breakfast Clubs and Grab and Go, and it is notable that in combination these two modes have a lower take-up rate than Grab and Go provision alone. The differences in take-up have direct implications for the ITT estimates: for a given effect on participating children, the ITT effect will be much larger for Classroom than for Breakfast Club provision simply because more children are exposed.

Figure 3 Take-up rates by provision mode (one provider)

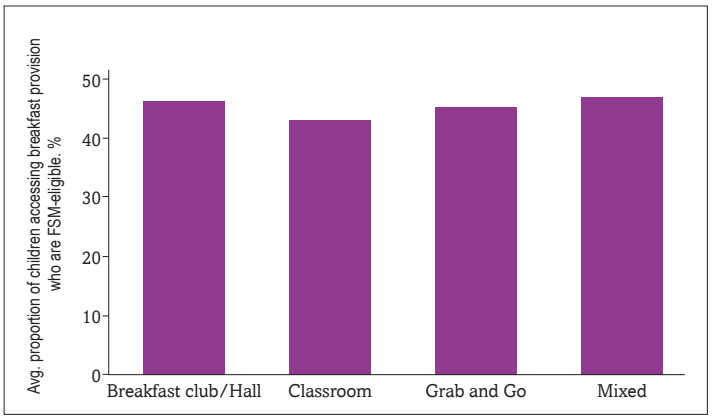


Notes One provider, 2015-16 to 2023-24 (excluding 2019-20). N= 1828 observations, 905 schools. Excludes "Unknown/other" provision and implausible FSM proportions.

The low take-up of Breakfast Clubs is noteworthy, particularly given that this is the model the government is currently rolling out nationally. Before-school clubs require families to change their morning routine, which may be a significant barrier. They are also likely to be used disproportionately by working households, for whom the childcare element is most valuable, while families where a parent is at home may see less benefit in getting children to school early.

Figure 4 shows that FSM-eligible children make up between 43% and 48% of breakfast participants across all provision modes - slightly above their share of the school population - and this does not vary significantly by mode. This is reassuring: it suggests that no single mode is systematically better or worse at reaching disadvantaged children, and that free breakfast schemes are broadly proportionate in their reach regardless of how they are delivered.

Figure 4 Proportion FSM-eligible children among breakfast participants, by provision mode



Notes One provider, 2015/16–2021/22 (excluding 2019/20). N=1,086 observations, 658 schools. Excludes "Unknown/other" provision and implausible FSM proportions.

5 Impact of breakfast schemes on school absences and educational attainment

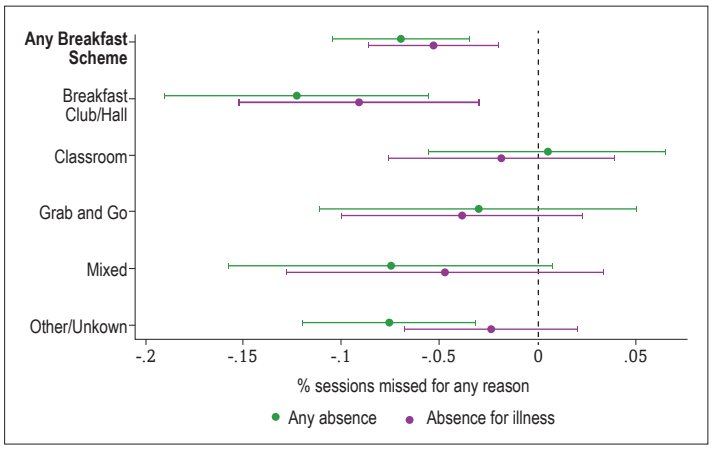
Absences

We begin by showing the effect of breakfast schemes on absences. Figure 5 shows average (Intention-to-Treat) estimates of the effect of free breakfast schemes on the percentage of school sessions missed at the top in bold. Each point estimate is shown with 95% confidence intervals; effects where the capped lines do not overlap with zero are statistically significant. Breakfast schemes reduce sessions missed by 0.07 percentage points overall, of which the majority (0.05 percentage points)

6 Take-up rates of breakfast schemes were calculated using data collected directly from schools by one of the organisations delivering the breakfast provision. The dataset included information on the number of students participating in the breakfast programme, as well as the proportion of those participants who were eligible for free school meals (FSM). To compute take-up rates, this data is linked to school census information on total primary pupil numbers and the percentage of pupils eligible for FSM. Take-up rates between 100% and 150% were capped and recorded as 100%, while any values exceeding 150% were considered unreliable and coded as missing. Observations where the `implied proportion' of FSM-eligible students in the breakfast data differed by more than ±10 percentage points from the FSM eligibility rate reported in the school census were also excluded from analysis.

reflects reduced illness-related absence. The reduction in absences is equivalent to about 0.13 fewer days per child per year, or roughly 30 fewer days of absence spread across an entire 240-pupil school over a full year.

Figure 5 Impact of breakfast schemes on absences by provision mode



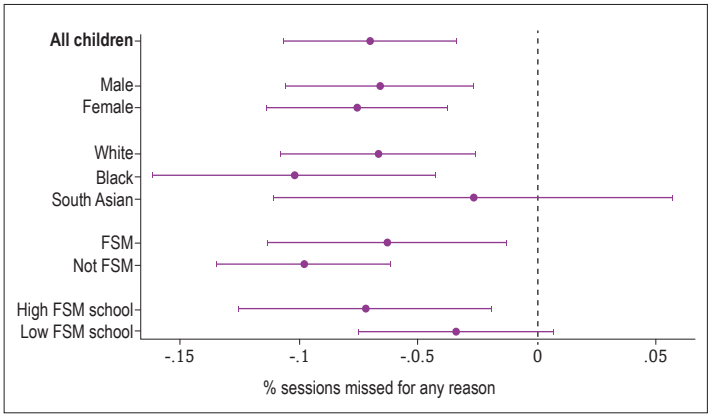
Notes National Pupil Database, 2006/07-2023/24 (excluding 2019/20, 2020/21) combined with harmonized provider-provided data on school breakfast provision modes. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator. See Technical Annex for additional controls.

Persistent absenteeism falls by 0.3 percentage points (Appendix Table A1), or 2.5% of the 12% baseline mean. This is equivalent to fewer than one child per school per year moving out of persistent absence. These effects are statistically detectable but likely too small to matter in practice. There is no statistically significant effect on absences for medical appointments or on late arrivals.

Effects by provision mode (Figure 5, lower panels) follow a similar pattern. The largest reduction (0.12 percentage points in any absence) comes from Breakfast Clubs, but this effect size too is negligible in practical terms. Notably, Classroom provision, which has by far the highest take-up, does not produce meaningfully larger absence reductions than other modes. This suggests that the route from breakfast provision to attendance is not simply about how many children take part.

Figure 6 shows absence effects by pupil and school characteristics. There is little variation across groups, and given the small magnitude of all effects, any differences between subgroups are of no practical consequence. Overall, free breakfast schemes have a detectable but trivially small effect on attendance. Reducing absenteeism (or increasing school attendance) does not appear to be a primary benefit of these schemes.

Figure 6 Impact of breakfast schemes on absences by background



Notes National Pupil Database, 2006/07-2023/24 (excluding 2019/20, 2020/21) combined with harmonized provider-provided data on school breakfast provision modes. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator and 95% confidence intervals. See Technical Annex for additional controls. Sub-group effects estimated on separate samples. White: White British and Irish; Black: Black African, Caribbean, and Mixed; South Asian: Indian, Pakistani, and Bangladeshi. FSM by current eligibility; High/Low FSM schools split at median in 2006/07.

Early Years Foundation Stage Profile

Table 3 shows the impact of free breakfast schemes on total EYFSP scores at age 5, expressed as within-cohort percentiles, and on each of the seven subdomains. The overall effect is small but consistent: total scores improve by around 0.3 percentiles, and six of the seven subdomains show statistically significant positive effects of similar magnitude. Reading and Writing is the exception, with no significant effect. To put this in context, the results mean that in a ranking among 1000 Reception children, a child exposed to a free breakfast scheme would move up by just three places. This is unlikely to be of practical significance on its own.

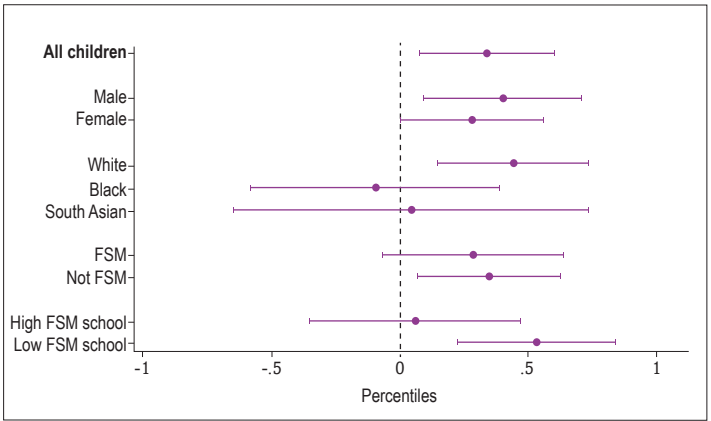
Effects vary considerably by provision mode. Mixed provision stands out, with a benefit of around 1 percentile point on total EYFSP and significant positive effects across all seven subdomains, roughly three times the average effect. Mixed provision offers children a choice of how to access breakfast, suggesting that flexibility in delivery may matter for programme success. Classroom provision also produces above-average gains in communication and language and physical development. Breakfast Clubs show no significant effects on any domain, which is likely explained by their low take-up: with fewer than one in three children participating, the effect would be heavily diluted even if the impact on children who do attend was meaningful.

Table 3 Impact of breakfast schemes on Early Years Foundation Stage Profile

	Total	Personal, Social, Emotional	Communication and Language	Physical Development	Reading and writing	Numbers	Understanding the world	Imagination and expressiveness
Any breakfast scheme	**0.335*** (0.137) 0.015 N: 416,315, N (schools): 3,500	0.276* (0.107) 0.010	**0.296**** (0.104) 0.004	**0.315**** (0.106) 0.003	**0.135** (0.111) 0.224	**0.295**** (0.110) 0.007	**0.361**** (0.132) 0.006	**0.286*** (0.129) 0.027
Breakfast Club/Hall	0.120 (0.246) N: 126,183, N (schools): 1,066	**0.103** (0.202)	**0.133** (0.188)	**0.106** (0.193)	**-0.076** (0.202)	**0.149** (0.202)	**0.253** (0.236)	**0.140** (0.232)
Classroom	**0.252** (0.215) N: 108,801, N (schools): 1,262	**0.371*** (0.166)	**0.446**** (0.160)	**0.543**** (0.163)	**-0.096** (0.178)	**0.313+** (0.171)	**0.315** (0.209)	**0.242** (0.209)
Grab and Go	**0.414** (0.274) N: 55,455, N (schools): 692	**0.329** (0.209)	**0.263** (0.202)	**0.379+** (0.206)	**0.278** (0.215)	**0.205** (0.213)	**0.384** (0.249)	**0.084** (0.252)
Mixed	**0.950*** (0.390) N: 45,773, N (schools): 486	**0.704*** (0.315)	**0.644*** (0.309)	**0.608+** (0.337)	**0.797*** (0.326)	**1.030**** (0.316)	**0.843*** (0.369)	**0.945*** (0.380)
Unknown/ other	**0.382+** (0.199) N: 45,773, N (schools): 486	**0.140** (0.143)	**0.171** (0.159)	**0.121** (0.150)	**0.301+** (0.160)	**0.145** (0.159)	**0.299** (0.187)	**0.337+** (0.199)

Notes National Pupil Database academic years-ending 2013-2024 (excluding 2020, 2021) combined with harmonized provider-provided data on school breakfast provision modes. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator. See Technical Annex for additional controls. Standard errors clustered at school level. +, *, ** indicate statistical significance at 10%, 5% and 1% levels respectively.

Figure 7 Impact of breakfast schemes on EYPSP total score, by background



Notes National Pupil Database, 2012/13-2023/24 (excluding 2019/20, 2020/21) combined with harmonized provider-provided data on school breakfast provision modes. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator and 95% confidence intervals. See Technical Annex for additional controls. Sub-group effects estimated on separate samples. White: White British and Irish; Black: Black African, Caribbean, and Mixed; South Asian: Indian, Pakistani, and Bangladeshi. FSM by current eligibility; High/Low FSM schools split at median in 2012/13.

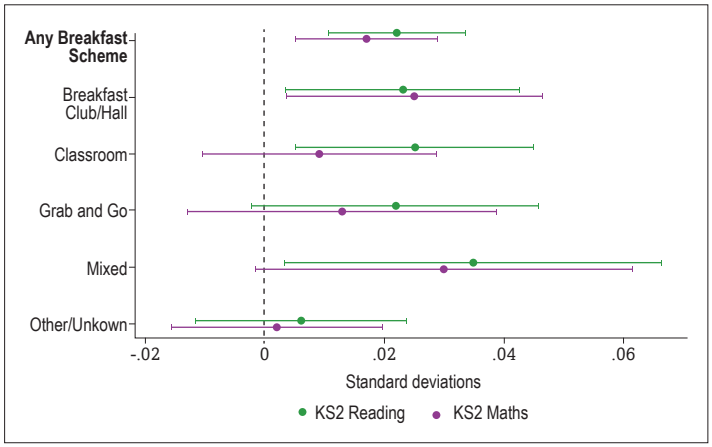
Figure 7 shows effects by pupil and school characteristics (see Appendix Table A2 for coefficient estimates). There are no significant differences by gender or individual FSM eligibility, perhaps reflecting that all schools in our sample are disadvantaged and non-FSM students in these schools are therefore likely to be relatively disadvantaged on average too. Benefits are larger for White than for ethnic minority children, and larger in low-FSM than high-FSM schools. Both patterns may reflect higher take-up in settings where working households, for whom the before-school childcare element is most valuable, are more prevalent: low-FSM schools, and schools with a higher share of White British pupils, tend to have more dual-income families.

Key Stage 2

Figure 8 shows Intention-to-Treat estimates for KS2 Reading and Maths at age 11, standardised within each year so that effects are expressed in standard deviations (see Appendix Table A3 for coefficient estimates). Breakfast schemes improve Reading scores by 2.2% of a standard deviation and Maths by 1.7%, equivalent to approximately one week of additional progress by the end of primary school. For context, this is roughly half the effect we found for Universal Free School Meals on the same outcomes (Holford and Rabe, 2024) - a reasonable benchmark given that lunch is a larger meal delivered to all children.

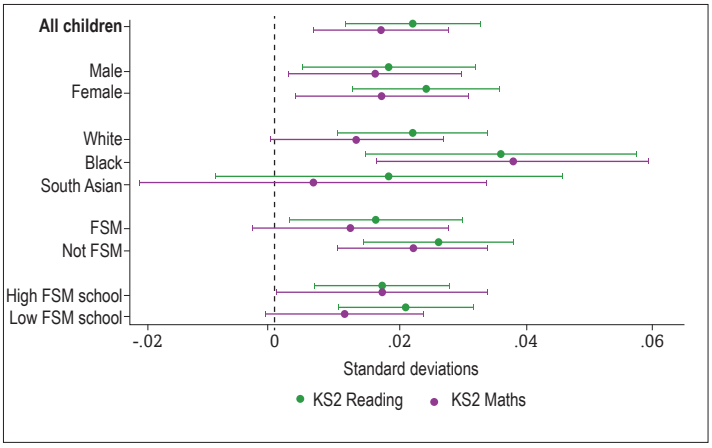
Effects by provision mode show a somewhat similar pattern to EYFSP. Mixed provision again produces the largest gains, for both Reading and Maths. Reading improvements are broadly similar across all four major modes, while Maths benefits are significant for Breakfast Clubs and Mixed provision only. Classroom provision, despite its high take-up, does not outperform other modes, a finding that echoes the EYFSP results and reinforces the conclusion that reach alone does not determine impact. Breakfast Clubs show significant effects at KS2, in contrast to their null EYFSP results, which could either reflect higher take-up among older children, an age-specific effect of the educational benefits, arising for example from socialising and speaking with others in the morning, or the longer cumulative exposure to breakfast provision by Year 6.

Figure 8 Impact of breakfast schemes on Key Stage 2 attainment



Notes National Pupil Database academic years-ending 2007-2024 (excluding 2020, 2021) combined with harmonized provider-provided data on school breakfast provision modes. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator and 95% confidence intervals. See Technical Annex for additional controls.

Figure 9 Impact of breakfast schemes on Key Stage 2 attainment by background



Notes National Pupil Database academic years-ending 2007-2024 (excluding 2020, 2021) combined with harmonized provider-provided data on school breakfast provision modes. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator and 95% confidence intervals. . See Technical Annex for additional controls.Sub-group effects estimated on separate samples. White: White British and Irish; Black: Black African, Caribbean, and Mixed; South Asian: Indian, Pakistani, and Bangladeshi. FSM by current eligibility; High/Low FSM schools split at median in 2006/07..

Figure 9 shows KS2 effects by pupil and school characteristics. While differences across groups are not statistically significant, some patterns are noteworthy. Estimated coefficients are larger for Black pupils (3.6% of a standard deviation in Reading, 3.8% in Maths) than for White (2.2% and 1.3%) or South Asian pupils (1.8% and 0.6%, not significant). This is in contrast to the EYFSP results, where benefits were larger for White pupils. Breakfast provision appears to widen ethnic gaps in teacher-assessed attainment at age 5 but narrow the Black-White gap in tested performance at age 11. Whether this reflects differences in assessment type, age, take-up or the longer cumulative exposure to breakfast provision by Year 6 is an open question.

Effects are also larger for non-FSM-eligible children (2.6% and 2.2%) than for FSM-eligible children (1.6% and 1.2%), though again the difference is not statistically significant. This pattern is consistent with the nutritional argument: non-FSM children in these schools do not receive a free lunch and may therefore rely more heavily on the breakfast provision for their nutritional intake during the school day. For these children, disadvantaged relative to the general population but not poor enough to qualify for FSM, a free breakfast may make a meaningful difference to how well they can concentrate and learn.

6 Impact of breakfast schemes on children's body weight

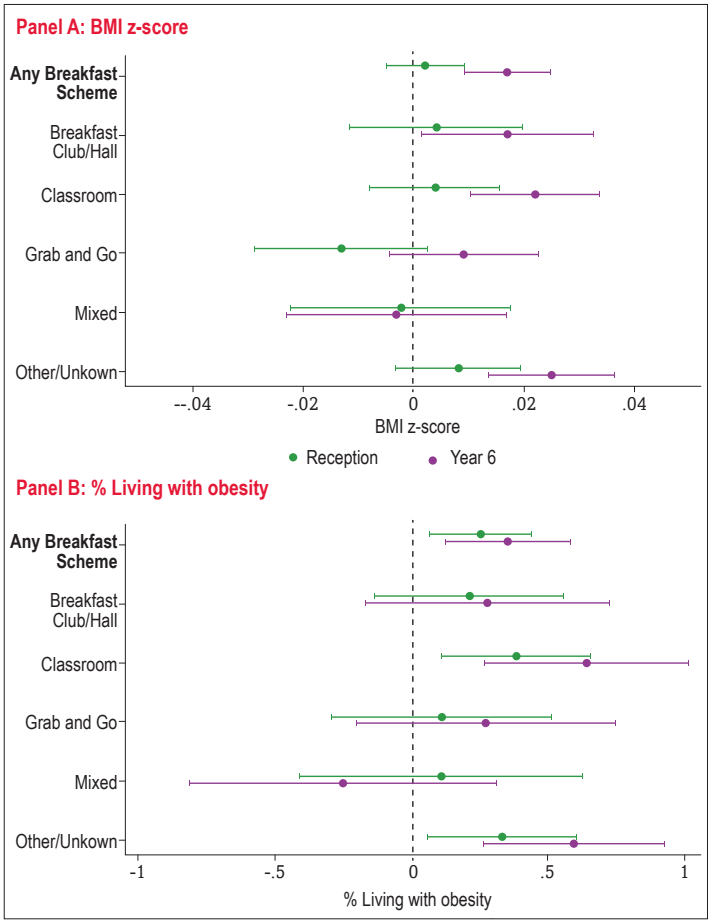
Figure 10 shows impacts of school breakfast schemes on BMI z-scores in Reception and Year 6 in the top panel and obesity prevalence in the bottom panel (see Appendix Table A4 for the estimates corresponding to the Figure). Breakfast schemes raise BMI z-scores in Year 6 (by 1.7% of a standard deviation) but not in Reception, and increase obesity prevalence in both year groups by 0.25 percentage points in Reception and 0.36 percentage points in Year 6. Relative to pre-treatment obesity rates of 12% in Reception and 25% in Year 6, these represent increases of around 2% and 1.4% respectively. This is equivalent to roughly one additional child living with obesity for every 400 children in Reception and every 280 in Year 6, and about half the size of the beneficial bodyweight effect of Universal Free School Meals (Holford and Rabe, 2022, 2024).

For Reception children, the absence of an average BMI effect alongside a significant obesity effect suggests that weight gains are concentrated at the top of the weight distribution. Year 6 children are affected both on average BMI and at the obesity threshold.

The pattern across provision modes is striking and possibly connected to the take-up findings. Classroom provision, which reaches over 84% of pupils, produces the largest increase in obesity prevalence: 0.38 percentage points in Reception and 0.64 percentage points in Year 6. This is consistent with high take-up in the classroom setting, where breakfast potentially becomes a norm regardless of whether children have already eaten at home, leading some to consume more than they need.[7] Breakfast Club, Mixed and Grab and Go provision, by contrast, show no statistically significant adverse effects on obesity prevalence in either year group, and some point estimates are negative. This suggests that these modes are better at directing provision towards children with genuine nutritional need, without promoting over-consumption among those who are already adequately fed. Breakfast Clubs do however raise BMI z-scores in Year 6, by 1.7% of a standard deviation.

Figure 11 explores the impact of breakfast schemes on obesity prevalence by school characteristics, as individual-level data are not available for the NCMP (see Appendix Table A5 for coefficient estimates).[8] Obesity prevalence outcomes are fairly similar across school characteristics. If anything, it appears that high-disadvantage schools are slightly more protected against the damaging effects of breakfast schemes on obesity prevalence than low-disadvantage schools. For example, obesity prevalence is unaffected by

Figure 10 Impact of breakfast schemes on children's body weight by provision mode



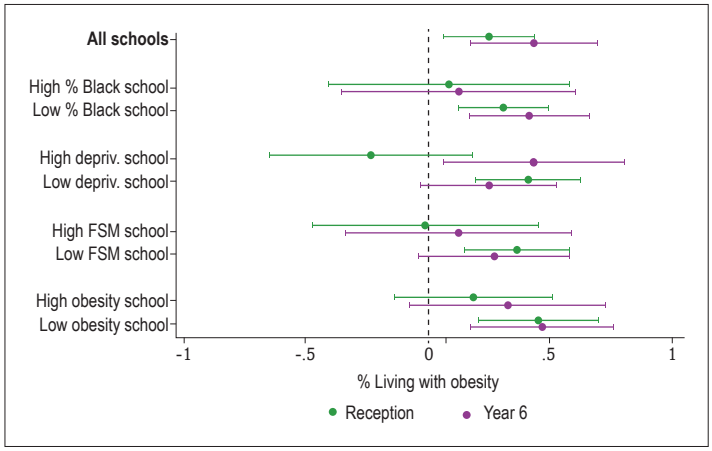
Notes : National Child Measurement Programme academic years-ending 2007-2024 (excluding 2021) combined with harmonized provider-provided data on school breakfast provision modes. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator. and 95% confidence intervals. See Technical Annex for additional controls.

breakfast provision in schools with high proportions of Black students and in high FSM schools, while their less disadvantaged counterparts see rises in obesity prevalence. Two explanations are plausible. First, in the most deprived schools, children are more likely to arrive genuinely hungry, so additional food is less likely to represent over-consumption relative to need. Second, baseline weight distributions differ across school types, such that equivalent changes in caloric intake may translate into different effects on measured obesity prevalence.

7 Note that there was a shift towards Classroom provision after the pandemic, making it difficult to disentangle the effect of different provision modes from the effect of the pandemic and cost of living crisis. However, Grab and Go style provision also increased after the pandemic and shows better outcomes for children's bodyweight.

8 Note that there are two cases (Low FSM school, Reception; and High obesity school, Year 6) where the parallel pre-trends test fails at the 10% level, that should be interpreted with caution.

Figure 11 Impact of breakfast schemes on children's probability of living with obesity, by school characteristics



Notes National Child Measurement Programme 2006/07-2023/24. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator and 95% confidence intervals. See Technical Annex for additional controls. High percent Black is >12%; high deprivation is defined as most deprived 50% of ever-treated schools according to Income Deprivation Affecting Children Index; high FSM is above 35% in 2008; high obesity is above median obesity, residualised by half-term of measurement only, for 2007-2009.

7 Impact of breakfast schemes on children's emotional and behavioural difficulties

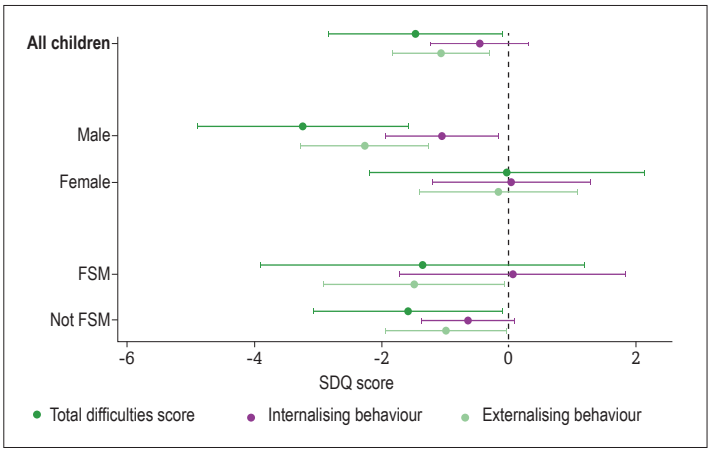
Children's mental health and wellbeing is an important policy outcome, and one that has deteriorated markedly since the pandemic. The Strength and Difficulties Questionnaire (SDQ) captures emotional and behavioural difficulties across domains including hyperactivity, conduct problems, emotional symptoms, and peer relationships, and our data contain parent-reported measures for children aged 5 and 8 and self-reported ones for ages 10 and 11. Beyond their intrinsic importance, these measures are also relevant as a potential mechanism: they may capture behaviours that are relevant in the classroom and may translate into educational benefits.

Figure 12 shows that breakfast schemes reduce Total Difficulties scores by 1.5 points on the 0–40 scale, equivalent to 22% of a standard deviation or a 14% reduction from the sample mean of 10.2 (see Appendix Table A6 for coefficient estimates). This is equivalent to about one and a half of the twenty difficulty items being rated a level lower (for example, "easily distracted" or "often loses temper" shifting from "certainly true" to "somewhat true"). The main reduction is in Externalising Behaviour (hyperactivity and conduct problems) by 1 point, with a smaller and less significant reduction in Internalising Behaviour. The effect is large by the standards of educational trials (Sanders et al., 2020) and compares favourably with dedicated whole-school wellbeing interventions evaluated in cluster-randomised trials in the UK (Blair et al., 2024; Humphrey et al., 2016).

The sample size in the survey data does not allow us to break down results by provision mode, but we can examine effects by gender and FSM eligibility. Figure 12 shows in the lower panels that the benefits of breakfast schemes accrue entirely to boys: boys show a 3-point improvement in Total Difficulties, driven by reductions in both Externalising and Internalising Behaviour, while girls show no significant improvement on any measure. This is consistent with evidence that school-based interventions tend to produce larger effects for boys, or for children with higher baseline difficulties (Blair et al., 2024; Ford et al., 2018). Effects do not differ significantly by FSM eligibility, which - as with the attainment results - suggests that the benefits are not confined to the hungriest children.

The concentration of behavioural benefits in boys, alongside attainment gains for both boys and girls, raises an interesting possibility. If reduced externalising behaviour (less hyperactivity and fewer conduct problems) contributes to a calmer classroom environment, girls may benefit indirectly through improved conditions for learning, even without showing direct improvements in their own measured difficulties.

Figure 12 Impact of breakfast schemes on emotional and behavioural difficulties



Notes UKHLS Waves 1-15. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator and 95% confidence intervals. See Technical Annex for how school fixed are implemented and additional controls.

8 Impact of breakfast schemes on household finances

In addition to child outcomes, we explore whether the availability of free school breakfast affects parents' subjective financial situation and household food spending.[9] Table 4 reports these estimates for all families and separately by FSM eligibility.

One motivation for providing free breakfast in schools serving disadvantaged populations is the possibility that it reduces financial pressure on families by saving the cost of providing breakfast. Table 4 reports estimates of the effect of breakfast schemes on two dimensions of household finances: parents' subjective financial situation, the closest available proxy for financial pressure on families in the data (asked separately of mothers and fathers) and household expenditure on groceries and takeaway food (in 2015 pounds per four-week period).

None of the estimated effects is statistically significant. Point estimates for subjective financial situation are very small and close to zero for both mothers and fathers, and do not differ meaningfully between FSM-eligible and non-FSM-eligible families. Estimated effects on grocery and takeaway spending are similarly small and imprecisely estimated. There is a negative (but not significant) point estimate for takeaway spending among non-FSM families, which could reflect modest substitution away from purchased food when children are fed at school, but the confidence intervals are wide, and the result should not be over-interpreted. It is possible that a free breakfast does reduce food costs for some families, particularly those who would otherwise have provided breakfast at home, but that any such saving is too small to register as an improvement in perceived financial situation. The absence of effects on grocery spending is consistent with this interpretation, though again the estimates are imprecise.

Table 4 Impact of breakfast schemes on financial situation and expenditure

	Subjective financial situation		Household expenditure (2015 £/4 weeks)	
	Mothers	Fathers	Groceries	Take-away
All families	**0.04** (0.03)	**0.03** (0.04)	**1.99** (10.66)	**-7.28** (5.28)
FSM eligible	**-0.04** (0.05)	**0.02** (0.08)	**2.63** (25.33)	**5.92** (11.69)
Not FSM eligible	**0.03** (0.03)	**-0.01** (0.05)	**-5.61** (10.95)	**-9.00** (5.67)
N	1,143	736	1,061	1,053

Notes UKHLS Waves 1-15. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator. Additional controls see Technical Appendix. Subjective financial situation is a binary variable equal to 1 if respondent finds it quite difficult or very difficult to manage financially. Groceries expenditure is the total amount spent on food and groceries in the last four weeks from a supermarket or other food shop or market; Take-away expenditure is the total amount spent on meals, snacks or non-alcoholic drinks purchased outside the home in the last four weeks, both in 2015 prices. Standard errors clustered at school level. Significance: + p<0.10, * p<0.05, ** p<0.01.

9 We also explored the impact of breakfast schemes on mothers' and fathers' labour market outcomes, but the parallel trend assumption was violated for these outcomes, so we do not report the results.

9 Conclusions and recommendations for policy and practice

This research has examined the impact of free, universal school breakfast schemes on children in disadvantaged primary schools in England, using secondary data spanning 2006–2024. The findings are nuanced: breakfast provision generates meaningful benefits across several outcomes, but also adverse effects on bodyweight, and the mode of delivery matters considerably for both.

What breakfast schemes achieve

Breakfast schemes improve educational attainment, by the equivalent of approximately one week of additional learning in both Reading and Maths at age 11. While modest, this is achieved at relatively low cost. Effects on EYFSP scores at age 5 are smaller and less consistent, but positive across most domains. Reductions in absence and persistent absenteeism are statistically significant but too small to be of much practical consequence.

Further, there is a large reduction in boys' emotional and behavioural difficulties: a 3-point improvement in Total Difficulties scores, driven mainly by reduced hyperactivity and conduct problems. This is a large effect by the standards of educational trials. The absence of equivalent benefits for girls is noteworthy but consistent with evidence that school-based interventions tend to produce larger effects for children with higher baseline difficulties. A calmer classroom environment - one consequence of reduced externalising behaviour in boys - may partly explain why attainment gains are broadly similar across genders despite the asymmetric wellbeing effects.

Bodyweight

The adverse effects on bodyweight are a cause for concern. Breakfast schemes increase obesity prevalence in both Reception and Year 6 on average, with the magnitude roughly half that of the beneficial effect of providing Universal Free School Meals. These effects are not inevitable: Breakfast Club, Mixed and Grab and Go provision show no significant adverse obesity effects (though Breakfast Clubs raise BMI z-scores in Year 6), while Classroom provision, with its high take-up, produces the largest increases. This suggests that the problem is not breakfast provision per se, but delivery models that promote consumption as a social default regardless of children's nutritional need. Schools and providers should be encouraged to design provision in ways that complement rather than supplement food consumed at home.

The nutritional quality of breakfast provision may also be relevant. School food standards are not clearly defined for breakfast specifically, and instead refer to the school day as a whole, while breakfast and lunch are typically planned and delivered independently, often by different staff or providers. This creates a risk that the nutritional profile of breakfast provision receives insufficient scrutiny. The government's planned introduction of new food standards from September is therefore welcome. However, standards alone are unlikely to be sufficient: their effectiveness will depend on monitoring of compliance and investment in staff training, particularly in schools where breakfast is delivered by non-catering staff in classrooms or on the go.

Provision mode

Across attainment, EYFSP, and bodyweight outcomes, Mixed provision consistently performs best: it achieves the largest educational gains, does not increase obesity prevalence, and reaches a substantial proportion of pupils. Classroom provision reaches the most children but fails to translate that reach into better educational outcomes, and produces the worst bodyweight profile. Breakfast Clubs, the model underpinning the national rollout, show the smallest educational effects, likely because low take-up dilutes the intention-to-treat estimates, and have adverse effects on BMI z-scores of children in Year 6. While Breakfast Clubs do produce significant KS2 attainment gains, their overall performance across outcomes is the weaker than other modes examined.

Implications for the national rollout

The government's Before School Breakfast Clubs programme is being rolled out to all primary schools in England, prioritising those serving disadvantaged pupils in the first instance. This study raises two aspects about that model that warrant attention.

Take-up. Fewer than one in three children attend Breakfast Clubs in our data, despite provision being free. Before-school clubs require families to change their morning routine, which is a meaningful barrier, and are likely used disproportionately by working households for whom the childcare element is valuable. The national programme should invest in understanding and reducing barriers to participation, particularly for families who are not in work, who may benefit most nutritionally but have least incentive to bring children in early. Communication with families, flexible start times, and outreach to the most disadvantaged households are possible levers.

Delivery model. The evidence suggests that offering children a choice of how to access breakfast, the Mixed model, consistently produces better outcomes than a single mode of delivery. This is despite reaching fewer children than Classroom and pure Grab and Go methods. The government should consider whether the national programme can accommodate flexibility in how breakfast is provided within schools, rather than prescribing a single before-school format.

References

Andrews, J., (2023), 'Recovering from the Covid-19 pandemic: analysis of Star assessments', Education Policy Institute, https://epi.org.uk/wp-content/uploads/2023/05/RecoveringFromTheCovid19PandemicMay2023.pdf

Blair, S., et al., (2024), 'The Social and Emotional Education and Development Intervention to Address Wellbeing in Primary school age children: the SEED cluster RCT'. Public Health Research DOI: https://doi.org/10.3310/LYRQ5047

Borusyak, K., Jaravel, X., Spiess, J., (2024), 'Revisiting event-study designs: robust and efficient estimation'. The Review of Economic Studies 91(6), 3253-3285.

Crawford, C. Edwards, A., Farquharson, C., Greaves, E., Trevelyan, G., Wallace, E., White, C., (2019), 'Magic Breakfast: Evaluation report and executive summary'. Education Endowment Foundation (EEF) report. https://dera.ioe.ac.uk/id/eprint/34837

de Chaisemartin, C., D'Haultfoeuille, X., (2018), 'Fuzzy differences-in-differences', Review of Economic Studies, 85:2, 999-1028.

Ford T, Hayes R, Byford S, et al. (2019), 'The effectiveness and cost-effectiveness of the Incredible Years® Teacher Classroom Management programme in primary school children: results of the STARS cluster randomised controlled trial'. Psychological Medicine. 49(5):828-842. doi:10.1017/S0033291718001484

Goodman-Bacon, A., (2021) 'Difference-in-differences with variation in treatment timing'. Journal of Econometrics, 225:2, 254-277.

Holford, A., Rabe, B., (2022), 'Going universal. The impact of free school lunches on child body weight outcomes'. Journal of Public Economics Plus, 100016. 10.1016/j.pubecp.2022.100016

Holford, A., Rabe, B., (2024), 'Universal free school meals and children's bodyweight. Impacts by age and duration of exposure'. Journal of Health Economics, Volume 98, 102937, https://doi.org/10.1016/j.jhealeco.2024.102937.

Holford, A., Rabe., B (2024), 'The impacts of Universal Free School Meal schemes in England', Final project report for Nuffield Foundation, DOI: 10.5526/misoc-2024-002

Humphrey, N., et al., (2016), 'A cluster randomized controlled trial of the Promoting Alternative Thinking Strategies (PATHS) curriculum'. Journal of School Psychology, pp.73-89. http://dx.doi.org/10.1016/j.jsp.2016.07.002

Lester, K., Michelson, D., (2024), Perfect storm: emotionally based school avoidance in the post-COVID-19 pandemic context, BMJ Mental Health 27(1):e300944, 10.1136/bmjment-2023-300944

Moore, G., Murphy S., Chaplin, K., Lyons, R., Atkinson, M., Moore, L., (2013), 'Impacts of the Primary School Free Breakfast Initiative on socio-economic inequalities in breakfast consumption among 9-11 year-old schoolchildren in Wales'. Public Health Nutrition 17:6, doi:10.1017/S1368980013003133

Mundlak, Y., (1978), 'On the Pooling of Time Series and cross Section Data'. Econometrica 46:1, 69-85.

Murphy, S., Moore, G., Tapper, K., Lynch, R., Coarke, R., Raisanene, L., Desousa, C., Moore, L., (2010), 'Free healthy breakfasts in primary schools: a cluster randomised controlled trial of a policy intervention in Wales, UK', Public Health Nutrition 14:2, DOI: 10.1017/S1368980010001886

Roth, J., (2022), 'Pretest with Caution: Event-Study Estimates after Testing for Parallel Trends'. American Economic Review: Insights, 4:3, 305-322.

Sanders, M., Mitchell, C. and Ni Chonaire, A., (2020), 'Effect sizes in education trials in England'. Rochester, NY Social Science Research Network. Available at https://doi.org/10.2139/ssrn.3532325.

Sun, L., Abraham S., (2021), 'Estimating dynamic treatment effects in event studies with heterogeneous treatment effects'. Journal of Econometrics, 225:2, 175-199.

University of Essex, Institute for Social and Economic Research. (2026). Understanding Society: Waves 1-15, 2009-2024 and Harmonised BHPS: Waves 1-18, 1991-2009: Secure Access. [data collection]. 18th Edition.UK Data Service. SN:6676, DOI: http://doi.org/10.5255/UKDA-SN-6676-18

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This work uses research datasets which may not exactly reproduce National Statistics aggregates.

Appendix

Table A1 Impact of breakfast schemes on absences by provision mode

	Percent of sessions missed due to:				
	Any reason	Illness	Medical Appointments	Arrived after registers closed	Persistently absent
Any breakfast scheme	-0.070**	-0.053**	-0.001	0.003	-0.003**
	(0.018)	(0.017)	(0.003)	(0.002)	(0.001)
N: 3,375,368, N (schools): 4,093					
Breakfast Club/Hall	-0.123**	-0.091**	-0.003	0.000	-0.005
	(0.034)	(0.031)	(0.004)	(0.004)	(0.002)
N: 1,275,170, N (schools): 1,399					
Classroom	0.005	-0.019	0.009*	0.010*	0.000
	(0.031)	(0.030)	(0.004)	(0.005)	(0.002)
N: 764,647, N (schools): 1,482					
Grab and Go	-0.030	-0.039	0.002	0.014*	-0.001
	(0.041)	(0.031)	(0.004)	(0.006)	(0.002)
N: 395,351, N (schools): 790					
Mixed	-0.075+	-0.048	-0.004	-0.004	-0.003
	(0.042)	(0.041)	(0.006)	(0.006)	(0.002)
N: 393,407, N (schools): 618					
Unknown/other	-0.076**	-0.024	-0.008*	-0.004	-0.004**
	(0.023)	(0.022)	(0.004)	(0.003)	(0.001)
N: 546,793, N (schools): 1,693					

Notes NPD, academic years 2007–2024 (excl. 2020, 2021), linked to provider data on provision modes. Shows intention-to-treat effects from Borusyak et al. (2024) imputation estimator. Additional controls see Technical Appendix. Standard errors clustered at school level. +, *, ** indicate statistical significance at 10%, 5% and 1% levels respectively.

Table A2 Impact of breakfast schemes on absences, EYFSP total and KS2 Reading and Maths by background

	Male	Female	White	Black	South Asian	FSM	Not FSM	High FSM	Low FSM
Absences for any reason	**-0.066****	**-0.076****	**-0.067***	**-0.102****	**-0.027**	**-0.063***	**-0.098****	**-0.072***	**-0.034**
	(0.020)	(0.019)	(0.021)	(0.030)	(0.043)	(0.026)	(0.018)	(0.027)	(0.021)
N	1732607	1642590	1681037	494515	469862	1310355	2064945	2014804	1360564
N (schools)	4091	4048	4058	3820	3206	4085	4082	2018	2075
EYFSP total score	**0.400****	**0.279***	**0.443****	**-0.093**	**0.048**	**0.284**	**0.344***	**0.057**	**0.532****
	(0.156)	(0.142)	(0.154)	(0.245)	(0.350)	(0.182)	(0.139)	(0.212)	(0.160)
N	213534	202568	211882	53864	55906	123435	292547	229027	187288
N (schools)	3497	3470	3398	2806	2137	3448	3491	1739	1761
KS2 Reading	**0.018****	**0.024****	**0.022****	**0.036****	**0.018**	**0.016***	**0.026****	**0.017***	**0.021****
	(0.007)	(0.006)	(0.006)	(0.011)	(0.014)	(0.007)	(0.006)	(0.009)	(0.008)
N	261571	259136	264892	77813	72807	202580	318139	305367	215402
N (schools)	3571	3516	3498	2892	2209	3558	3556	1805	1774
KS2 Maths	**0.016***	**0.017***	**0.013+**	**0.038****	**0.006**	**0.012**	**0.022****	**0.017+**	**0.011**
	(0.007)	(0.007)	(0.007)	(0.011)	(0.014)	(0.008)	(0.006)	(0.009)	(0.009)
N	262926	259066	265223	77910	72922	203114	318874	306151	215879
N (schools)	3578	3511	3502	2899	2208	3561	3562	1810	1774

Notes NPD, academic years 2013–2024 (excl. 2020, 2021), linked to provider data on provision modes. . Shows intention-to-treat effects from Borusyak et al. (2024) imputation estimator. Additional controls see Technical Appendix. Standard errors clustered at school level. +, *, ** indicate statistical significance at 10%, 5% and 1% levels respectively.

Table A3 Impact of breakfast schemes on Key Stage 2 attainment

	Reading	Maths
Any breakfast scheme	**0.022****	**0.017****
	(0.006)	(0.006)
Treated N	520769	522030
Ever-treated schools	3579	3584
Breakfast Club/Hall	**0.023***	**0.025***
	(0.010)	(0.011)
Treated N	193571	194213
Ever-treated schools	1270	1273
Classroom	**0.025***	**0.009****
	(0.010)	(0.010)
Treated N	117517	117711
Ever-treated schools	1229	1231
Grab and Go	**0.022+**	**0.013**
	0.012	0.013
Treated N	65169	65250
Ever-treated schools	720	720
Mixed	**0.035***	**0.030+**
	(0.016)	(0.016)
Treated N	60440	60622
Ever-treated schools	556	556
Unknown/other	**0.006**	**0.002**
	(0.009)	(0.009)
Treated N	84072	84234
Ever-treated schools	1473	1476

Notes NPD, academic years 2007–2024 (excl. 2020, 2021), linked to provider data on provision modes. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator.. Additional controls see Technical Appendix. Standard errors clustered at school level. Significance: + p<0.10, * p<0.05, ** p<0.01

Table A4 Impact of breakfast schemes on children's body weight by provision mode

	Reception			Year 6		
	Overweight or obese, %	Living with obesity, %	BMI z-score	Overweight or obese, %	Living with obesity, %	BMI z-score
Any breakfast scheme	0.066	0.251*	0.002	0.430**	0.358**	0.017**
	(0.132)	(0.097)	(0.004)	(0.134)	(0.118)	(0.004)
	N: 11,241, N (schools): 2906			N: 11,527, N (schools): 2972		
Breakfast Club	0.146	0.211	0.004	0.313	0.276	0.017+
	(0.247)	(0.175)	(0.008)	(0.259)	(0.231)	(0.008)
	N: 4007, N (schools): 1009			N: 4082, N (schools): 1035		
Classroom	0.264	0.382**	0.004	0.918**	0.639**	0.022**
	(0.189)	(0.139)	(0.006)	(0.214)	(0.192)	(0.006)
	N: 2353, N (schools): 1011			N: 2312, N (schools): 999		
Grab and Go	-0.226	0.115	-0.013	0.261	0.271	0.009
	(0.289)	(0.205)	(0.008)	(0.269)	(0.243)	(0.008)
	N: 1239, N (schools): 592			N: 1322, N (schools): 627		
Mixed	-0.219	0.105	-0.002	-0.037	-0.252	-0.003
	(0.345)	(0.264)	(0.010)	(0.319)	(0.286)	(0.010)
	N: 1210, N (schools): 435			N: 1236, N (schools): 448		
Other/Unknown	0.032	0.334*	0.008	0.506*	0.591**	0.025**
	(0.181)	(0.137)	(0.006)	(0.199)	(0.169)	(0.006)
	N: 2432, N (schools): 1271			N: 2575, N (schools): 1305		

Notes NCMP, academic years 2007–2024 (excl. 2021), linked to provider data on provision modes. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator.. Additional controls see Technical Appendix. N = treated school-year observations; N (schools) = unique schools. Standard errors clustered at school level. Significance: + p<0.10, * p<0.05, ** p<0.01.

Table A5 Impact of breakfast schemes on living with obesity (%) by school characteristics

	Black ethnicity		IDACI		FSM in 2008		Baseline obesity		Unhealthy outlets in 2013		
	>12%	>12%	High deprivation	Low deprivation	>35%	>35%	Above median	Below median	None	0-6.1/ km^2	>6.1/km^2
Column	1	2	3	4	5	6	7	8	9	10	11
Reception											
	0.084	0.307**	-0.234	0.410**	-0.013	0.367**	0.180	0.449**	0.209	0.470*	0.240
	(0.250)	(0.092)	(0.214)	(0.110)	(0.234)	(0.100)	(0.168)	(0.125)	(0.222)	(0.213)	(0.163)
N	3028	8213	5793	5335	3864	5433	4902	4362	3196	2113	3549
N (schools)	623	2283	1276	1576	660	1632 Pre-trends fails at 10%	1134	1146	791	552	801
Year 6											
	0.125	0.412**	0.435*	0.251+	0.124	0.270+	0.326	0.468**	0.234	-0.053	0.291
	(0.259)	(0.130)	(0.191)	(0.141)	(0.240)	(0.159)	(0.202)	(0.151)	(0.222)	(0.275)	(0.236)
N	3112	8415	5865	5517	3937	5400	4941	4317	3222 7	2079	3622
N (schools)	655	2317	1291	1616	669	1606	1110 Pre-trends fails at 10%	1131	86	546	803

Notes NCMP, academic years 2007–2024 (excl. 2021), linked to provider data on provision modes. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator.. Additional controls see Technical Appendix. N = treated school-year observations; N (schools) = unique schools. Standard errors clustered at school level. Significance: + p<0.10, * p<0.05, ** p<0.01.

Table A6 Impact of breakfast schemes on emotional and behavioural difficulties

	Total difficulties score	Internalising behaviour	Externalising behaviour
Whole sample	-1.472*	-0.454	-1.074**
	(0.699)	(0.39)	(0.411)
Boys	-3.226**	-1.053*	-2.257**
	(0.838)	(0.466)	(0.508)
Girls	-0.0186	0.0556	-0.147
	(1.102)	(0.621)	(0.628)
FSM-eligible	-1.343	0.0724	-1.515*
	(1.296)	(0.901)	(0.739)
Not FSM-eligible	-1.583*	-0.627+	-0.985*
	(0.758)	(0.377)	(0.480)
N	368	368	368
N (schools)	236	236	236

Notes UKHLS Waves 1–15. Shows intention-to-treat effects from Borusyak et al., (2024) imputation estimator. Additional controls see Technical Appendix. Standard errors clustered at school level. Significance: + p<0.10, * p<0.05, ** p<0.01.

Technical Annex

Data and outcomes variables

We created a dataset with one line per school per academic year, with an indicator for any universal breakfast provision and the mode of this provision, harmonized from school-level data provided by Magic Breakfast, The Greggs Foundation and the National School Breakfast Programme. We link these data to the separate datasets containing child-or-school-level outcome variables, to provide a consistent indicator of breakfast provision for children in a given school and year, across all our outcomes. For educational attainment and absences, we use individual-level data, and for BMI classifications school-level data on the population of children (in the relevant school year-groups) attending mainstream state-funded schools in England. For emotional and behavioural difficulties and household expenditure and financial situation we use data from a nationally representative household survey that tracks the same children over time.

Outcome variables

For **absences, persistent absence** and **punctuality** we use individual data on counts of half-day absences from school by reason, from the National Pupil Database (NPD). We derive the following outcome variables:

- Overall: Percent of sessions in the school year missed for any reason
- Illness: Percent of sessions in the school year missed for illness
- Medical appointments: Percent of sessions in the school year missed for medical and dental appointments
- Late: Percent of sessions recorded as missed because the pupil arrived after the registers closed.
- Persistent absence: A binary outcome, equal to one if the pupil missed more than 10% of possible sessions in the year

For educational attainment we use individual data on teacher-assessed **Foundation Stage Profile** (EYFSP) data and performance in **Key Stage 2** (KS2) assessments in **Reading** and **Maths** at the end of primary school from the NPD. We derive the following outcome variables:

- **Key Stage 2:** Within-year standardized test scores in:
  - Reading
  - Maths
- **Early Years Foundation Stage Profile**. Teacher assessments of pupils' progress relative to the expected standard on 17 dimensions of development. We sum pupils' scores, and convert these to pupils' within-year percentiles for their Total score, and subdomains for:
  - Personal, social and emotional
  - Communication and language
  - Physical development
  - Reading and writing
  - Numbers
  - Understanding the world
  - Imagination and expressiveness.

For children's **BMI classifications** and **obesity prevalence** we use school-level data from the National Child Measurement Programme (NCMP). The following outcome variables are available for both children in Reception and in Year 6:

- Percent living with overweight or obesity: Percent of children measured with BMI above 85th percentile of UK 1990 growth charts for age and sex.
- Percent living with obesity: Percent of children measured with BMI above 95th percentile of UK 1990 growth charts for age and sex.
- Mean BMI z-score: A z-score means 'standard deviations above or below the mean' of an outcome. Here we use the mean z-score from applying measured children's BMI to the distribution in the UK 1990 growth charts.

The 85th and 95th percentiles respectively are population monitoring rather than clinical thresholds.

For child **emotional and behavioural difficulties**, we use Understanding Society, the UK Household Longitudinal Study (UKHLS). Our outcome variables are derived from the Strengths and Difficulties Questionnaire (SDQ), which is a behavioural screening questionnaire for children. We use 20 items for children's difficulties, consisting of 5 each for the domains of emotional symptoms, conduct problems, hyperactivity and peer relationship problems. We use data on these items reported by parents for children aged 5 or 8, and by children using a self-completion survey aged 10 or 11. We present the following outcomes in our main report:

- Externalising behaviour score (derived from the hyperactivity and conduct problem items)
- Internalising behaviour (derived from emotional symptoms and peer relationship items).
- Total Difficulties Score (derived from items included in Externalising and Internalising behaviour)

Each questionnaire item has values ranging from 0-2 (0: not true, 1: somewhat true, 2: certainly true), so that each domain has a maximum score of 10, Externalising/Internalising behaviour which summarise two domains each have a maximum score of 20, and the Total Difficulties a maximum score of 40.

Methods

Intention to Treat effects of any provision

We exploit the staggered rollout of free breakfast provision over time in primary schools in England. Our treatment is the availability of free breakfast to all pupils in the school. The counterfactual is a combination of no breakfast provision, targeted free provision for some pupils, paid-for provision and universal free provision that we do not observe.

All our estimates of the treatment effect of school breakfast programmes use the Borusyak et al,. (2024) imputation estimator. This is an adapted version of the difference-in-difference estimator appropriate to our setting with variable treatment timing and potentially heterogeneous effects, in which the canonical the 2WFE estimator is likely to be biased towards zero in the most likely case of impacts of policy exposure accumulating over time (de Chaisemartin and D'Haultfoeuille, 2018, Goodman-Bacon, 2021). This estimator relies on the assumption of parallel counterfactual trends: that changes over time in schools that do not or have not yet adopted school breakfast programmes are a good guide to what would have happened in schools that did adopt school breakfast programmes, had they not done so.

The implementation of this method differs slightly according to the data being used for each outcome. We show the specification for one case of individual-level repeated cross-sectional data in the National Pupil Database below, and explain the adaptations for the NCMP and UKHLS data below.

We first estimate a school-and-year fixed effect regression on the sample of children in not-yet-treated schools only, of the form:

$$Y_{ist} = \alpha_1 \boldsymbol{Year_t} + \alpha_2 \boldsymbol{School_s} + \gamma^i \boldsymbol{X^i_{ist}} + \gamma^s \boldsymbol{X^s_{st}} + \epsilon_{ist} \quad (1)$$

Here Y_{ist} is the outcome of child i in school s in year t. $\boldsymbol{Year_t}$ is a vector of year fixed-effects and $\boldsymbol{School_s}$ of school fixed-effects, $\boldsymbol{X^i}_{ist}$ of child characteristics, $\boldsymbol{X^s}_{st}$ of school characteristics, and ϵ_{ist} is an idiosyncratic error term.

We discuss the composition of the vectors of child and school characteristics in the next subsection. We use the coefficient estimates in equation (1) to generate predicted untreated outcomes for children in treated schools. The difference between a child's actual and predicted outcomes is an estimate of that child's treatment effect. The mean difference between actual and predicted outcomes across all children is the estimated Intention-to-Treat (ITT) impact of the treatment, and we report this with standard errors clustered at the school-level. This is an ITT because we assign children's exposure to different breakfast schemes at the school-by-year level, and because we do not have individual-level data on participation or uptake of these breakfast schemes.

The prediction model specified in equation (1) is used for our analysis of educational attainment and absences observed in population administrative data. The data for educational attainment are repeated cross-sections of individuals; for absences we have an individual-level panel but retain the same school fixed-effect specification.

For our analysis of BMI classifications, we have only school-level data. Here the i subscript is dropped from the outcome variable, and dropped from the covariate set. The method is otherwise implemented in the same way, and we weight observations in proportion to the school's average cohort size over the analysis period to take account of differences in school size.

For our analysis of emotional and behavioural difficulties, household expenditure and financial situation we again have individual data, but as these are drawn from a nationally representative sample, rather than population data, they have few observations per school. In this case, estimated school fixed effects would largely capture noise from sampling variation, making them unsuitable for out-of-sample predictions. To address this, we replace the vector of school fixed-effects $\boldsymbol{School_s}$ with a vector of *pre-treatment means of school characteristics*, from publicly available school-level data to mimic the adoption of a correlated random effect instead of fixed-effect model (Mundlak, 1978). We use survey weights to make the data representative of the population.

Intention to Treat effects by mode of provision

Impacts by mode of provision are calculated simply from the mean of the Intention to Treat effects calculated using the procedure above, for the population exposed to each specific mode. It is important to emphasize that schools' decisions over mode of provision will be determined by the constraints and characteristics faced in each specific context; and the relative magnitude of the estimated treatment effects does not imply that any particular school could improve outcomes by switching to an apparently more beneficial mode.

Heterogeneity by background characteristics

To report heterogeneous impacts of breakfast provision by background characteristics, we re-estimate the prediction regression (1) to generate new counterfactual predictions based on each separate sub-population of children or schools of interest; or equivalently, a fully-interacted version of the prediction model. This allows for different sub-groups of the population of ever-treated schools to have different prevailing trends (i.e. different estimated year fixed-effects) or impacts of other characteristics.

These groups for heterogeneity analyses again differ slightly according to the nature of available data.

For absences and educational attainment we show results by:

- Sex: Male and Female.
- Ethnicity: White (White British and White Irish), Black (Black African, Black Caribbean, and Mixed Black African or Caribbean and White), South Asian (Indian, Pakistani and Bangladeshi)
- Free School Meal (FSM) eligibility: FSM (currently eligible) and Not FSM (not currently eligible)
- School-level FSM eligibility: High FSM school (above the median for ever-treated schools in 2012/13) or Low FSM school (below the median).

For BMI classifications we show results by:

- Percent of Black ethnicity children among those measured: High % Black (average of more than 12% Black ethnicity across all years) and Low % Black (average of less than or equal to 12% Black).

- Deprivation: High deprivation (above median deprivation among ever-treated schools, according to Income Deprivation Affecting Children Index, IDACI) and Low deprivation (below median).
- School-level FSM eligibility: High FSM school (above the median for ever-treated schools in 2008/09) or Low FSM school (below the median).
- By baseline prevalence of living with obesity: High obesity (above median of obesity prevalence residualised by half-term of measurement only, among ever-treated schools, in academic years-ending 2007-2009).

For emotional and behavioural difficulties we show results by:

- Sex/gender: Male/Boys and Female/Girls
- Free School Meal (FSM) eligibility: FSM (currently eligible) and Not FSM (not currently eligible)

For household expenditure and financial situation we show results by FSM eligibility only.

Note that the groupings into "High" and "Low" schools with respect to FSM, deprivation and Black schools are designed to place roughly equal numbers of ever-treated schools in each group. High or Low should therefore be considered a relative term, since the ever-treated schools tend to be more ethnically diverse and deprived than typical schools in England.

Parallel trend checks

Recent literature on difference-in-difference settings with heterogeneous treatment effects has underscored the importance of separating estimation of treatment effects from tests for deviations of parallel trends (Sun and Abraham, 2021, Roth, 2022). We adopt the 'placebo' estimator proposed by Borusyak et al., (2023) as a companion to their imputation estimator. This entails estimating a fixed-effects regression on pre-treated observations (or, where appropriate to the sample being used, pre-treated and never-treated observations) only, of the following form:

$$Y_{ist} = \sum_{t=-p}^{-1} \beta_t^{pre} COUNTDOWN_{ist} + \alpha_1 \boldsymbol{Year_t} + \alpha_2 \boldsymbol{School_s} + \gamma \boldsymbol{X_{ist}^i} + \gamma^s \boldsymbol{X_{st}^s} + \epsilon_{ist} \quad (2)$$

This is adapted as appropriate for each form of data in line with the main prediction regression.

The dummy variables $COUNTDOWN_{ist}$ are equal to one for children in schools in eventually-treated schools in the t^{th} period before breakfast provision is first introduced. There is a dummy variable for each of p pre-treatment periods. Here we use p=3, in other words capturing deviations from parallel pre-trends occurring over the three years prior to treatment. Our objects of interest are the β_t^{pre}, which indicate any deviation from parallel trends for a later treated school in period t. If pre-trends are conditionally parallel, β_t^{pre} should not be significantly different from zero in any pre-treatment period, and there should be no systematic movement of this conditional difference in either direction. We test for the joint significance of all the β_t^{pre} using an F-test or Wald chi-square test statistic, from a specification with clustered and heteroscedasticity-robust standard errors.

Results of the parallel trend checks for our main estimates are shown later in this Annex. We do not separately estimate these checks for different modes of provision, since in many instances the countdown period involves treatment via a different mode. We do separately estimate parallel trends checks for all heterogeneity sub-groups, and these hold with the exception of two cases noted in Table A5 of the full report (For living with obesity, Low FSM schools for Reception; and above median obesity schools for Year 6).

Control variables

We use time fixed-effects and either school fixed-effects or long-run means of school-level characteristics to account for the potential confounding effect of prevailing trends in outcomes over time as breakfast clubs were introduced and permanent differences between earlier-and-later adopting schools. We further control for the potential confounding effects of changes in pupil and school-level characteristics by including suitable control variables. These differ according to what is recorded in the dataset of outcome variables, or what school-level data we were permitted to link to the outcomes to reduce disclosure risk.

Educational attainment and absences

Individual-level controls	School-level controls
Sex	
Eligible for Free School Meals	Percent eligible for Free School Meals
IDACI percentile of Lower Super Output Area (LSOA) of residence	
Ethnicity (18 categories)	Percent ethnicity minority students
Any SEN provision	
English as an Additional Language	Percent English as an Additional Language
Exposure to universal free school lunch scheme	
	School type (e.g. community, academy, voluntary-aided)
	Density of unhealthy outlets around school (6 categories, for zero and 5 quintiles).

BMI classifications

School-by-year-group level controls	
Percent of children measured who are:	IDACI, decile among ever-treated schools, interacted with cubic year-trends
• Female	Exposure to universal free school lunch scheme
• Black	Average per-pupil sports premium
• Missing ethnicity	Over 35% eligible for Free School Meals
All interacted with half-term of measurement and cubic year-trends	Density of unhealthy outlets around school (6 categories, for zero and 5 quintiles).

Emotional and behavioural difficulties

Individual-level controls	School-level controls
Child gender	
Age (5, 8, 10, 11; 5 is omitted category)	
Relative age (12 for September births down to 1 for August births)	
Ethnic group (11 dummy variables, omitted is White British)	Percent ethnic minority
Whether eligible for Free School Meals	Percent eligible for free school meals
Single parent-household	
IDACI decile of Lower Super Output Area (LSOA) of residence (10 for least deprived down to 1 for most deprived)	
	Percent first language not English
	Year in which school was academised (coded as zero if school has not been academised)

Output from parallel trend tests

We show Borusyak et al's. (2024) parallel trends check for each of our outcomes. This comprises coefficients and standard errors for the 'countdown' periods, showing how outcomes change in the three periods leading up to the introduction of the breakfast programme in regressions of pre- and un-treated schools only. We also show the F-statistic and p-value for their joint significance. Where this is greater than 0.1 we fail to reject parallel trends. As the tables show, this is the case for all the pre-trends.

Table T1 Pre-trend test statistics for impacts of breakfast provision on Absences

	Percent of sessions missed due to				
	Any reason	Illness	Medical Appointments	Arrived after registers closed	Persistently absent
1 year before	-0.020	0.002	-0.005	-0.003	-0.002
	(0.023)	(0.018)	(0.003)*	(0.003)	(0.001)
2 years before	0.000	-0.015	-0.002	0.001	-0.001
	(0.022)	(0.021)	(0.003)	(0.003)	(0.001)
3 years before	-0.010	-0.004	-0.002	-0.003	-0.001
Std err	(0.018)	(0.015)	(0.003)	(0.002)	(0.001)
F-stat for joint-significance of countdown:	0.384	0.329	1.245	1.358	0.577
p-value	0.764	0.805	0.292	0.254	0.630
Pre-treated observations	8647954	8647954	8647954	8647954	8647954

Notes NPD, academic years 2007–2024 (excl. 2020, 2021), linked to provider data on provision modes. Shows coefficients and joint significance of pre-treatment countdown periods as pre-trend test for Borusyak et al. (2024) imputation estimator. Additional controls as listed above. Standard errors clustered at school level. Observations shown are pooled number of children in pre-treated schools. +, *, ** indicate statistical significance at 10%, 5% and 1% levels respectively.

Table T2 Pre-trend test statistics for impacts of breakfast provision on Early Years Foundation Stage Profile domains

	Within-year percentiles for:							
	Total	Personal, Social, Emotional	Communication and Language	Physical Development	Reading and writing	Numbers	Understanding the world	Imagination and expressiveness
1 year before	0.149	0.102	0.145	0.115	0.105	0.095	0.267	0.209
Std err	(0.186)	(0.147)	(0.143)	(0.147)	(0.156)	(0.152)	(0.180)	(0.179)
2 years before	0.061	-0.032	0.107	0.121	0.105	0.006	0.220	-0.010
Std err	(0.200)	(0.166)	(0.155)	(0.159)	(0.168)	(0.161)	(0.192)	(0.194)
3 years before	0.053	0.013	0.072	0.098	-0.042	-0.057	0.183	0.096
Std err	(0.161)	(0.131)	(0.130)	(0.132)	(0.133)	(0.134)	(0.156)	(0.160)
F-stat for joint-significance of countdown:	0.231	0.294	0.391	0.349	0.325	0.251	1.019	0.738
p-value	0.875	0.830	0.759	0.790	0.808	0.861	0.383	0.529
Pre-treated observations	883833	883833	883833	883833	883833	883833	883833	883833

Notes NPD, academic years 2013–2024 (excl. 2020, 2021), linked to provider data on provision modes. . Shows coefficients and joint significance of pre-treatment countdown periods as pre-trend test for Borusyak et al. (2024) imputation estimator. Additional controls as listed above. Standard errors clustered at school level. Observations shown are pooled number of children in pre-treated schools. +, *, ** indicate statistical significance at 10%, 5% and 1% levels respectively.

Table T3 Pre-trend test statistics for impacts of breakfast provision on BMI Classifications

	Reception			Year 6		
	Overweight or obese, %	Living with obesity, %	BMI z-score	Overweight or obese, %	Living with obesity, %	BMI z-score
Countdown						
1 period before	0.084	-0.047	-0.005	0.307	0.107	0.012
Std err.	0.228	0.163	0.007	0.236	0.207	0.006
p-value	0.711	0.775	0.439	0.193	0.607	0.066
2 periods before	0.070	-0.065	-0.005	0.030	0.034	0.003
Std err.	0.223	0.157	0.006	0.227	0.204	0.006
p-value	0.754	0.678	0.430	0.895	0.866	0.670
3 periods before	0.002	0.009	-0.002	0.153	0.338	0.008
Std err.	0.207	0.150	0.006	0.231	0.194	0.006
p-value	0.992	0.954	0.786	0.508	0.082	0.211
Observations in pre-treatment regression	27244	27244	27244	27359	27359	27359
F statistic for joint significance of countdown	0.069	0.084	0.320	0.658	1.074	1.404
p-value	0.976	0.969	0.811	0.578	0.359	0.240

Notes NCMP, academic years 2007–2024 (excl. 2021), linked to provider data on provision modes. Shows coefficients and joint significance of pre-treatment countdown periods as pre-trend test for Borusyak et al. (2024) imputation estimator. Additional controls as listed above. Observations shown are pooled number of pre-treated school-years. Standard errors clustered at school level. Significance: + p<0.10, * p<0.05, ** p<0.01.

Table T4 Pre-trend test statistics for impacts of breakfast provision on Strength and Difficulties Questionnaire outcomes

	(1) Total difficulties	(2) Externalising behaviour	(3) Internalising behaviour
1 year before treatment	0.276 (0.929)	0.129 (0.608)	0.135 (0.451)
2 years before treatment	0.0745 (0.862)	0.103 (0.518)	-0.0431 (0.451)
3 years before treatment	0.610 (0.807)	0.448 (0.496)	0.132 (0.412)
Wald chi-square statistic p-value Observations	0.611 0.894 1,411	0.816 0.846 1,411	0.215 0.975 1,411

Notes UKHLS Waves 1–15. Shows coefficients and joint significance of pre-treatment countdown periods as pre-trend test for adapted Borusyak et al. (2024) imputation estimator. Additional controls see Technical Appendix. Standard errors clustered at school level. Significance: + p<0.10, * p<0.05, ** p<0.01.

Table T5 Pre-trend test statistics for impacts of breakfast provision on subjective financial expectations and household expenditures

	Subjective financial expectations		Household expenditure (2015 £/4 weeks)	
	Mothers	Fathers	Groceries	Take-away
1 period before treatment	0.0173 (0.0452)	-0.000461 (0.0497)	21.24 (14.76)	-7.433 (9.979)
2 periods before treatment	0.0166 (0.0351)	0.0311 (0.0378)	1.396 (11.71)	-9.874 (8.765)
3 periods before treatment	0.0043 (0.0271)	-0.0244 (0.0299)	3.509 (11.52)	0.426 (9.578)
Observations Number of groups Wald chi-square statistic p-value	5490 1169 0.283 0.963	3287 802 1.564 0.668	4980 1128 2.153 0.541	4981 1128 2.003 0.572

Notes UKHLS Waves 1–15. Shows coefficients and joint significance of pre-treatment countdown periods as pre-trend test for adapted Borusyak et al. (2024) imputation estimator. Additional controls see Technical Appendix. Standard errors clustered at school level. Significance: + p<0.10, * p<0.05, ** p<0.01.

Limitations

This study uses intention-to-treat estimates based on schools' offer of free breakfast rather than individual take-up, and take-up data are available from one provider only. The analysis of provision modes is complicated by the fact that Classroom, Grab and Go, and Mixed provision expanded primarily after the pandemic, making it difficult to fully disentangle mode effects from time-period effects.

A further limitation concerns the endogeneity of provision mode. Schools are not randomly assigned to deliver breakfast in a particular way; the mode adopted is likely to reflect school characteristics, physical infrastructure, staffing, and leadership - factors that may also influence children's outcomes independently of breakfast provision. Our comparisons across provision modes should therefore be interpreted with caution, as unobserved differences between schools adopting different modes may confound the estimates. Randomised or quasi-experimental evidence specifically targeting provision mode would be needed to establish causal effects with confidence.

The evidence on children's emotional and behavioural difficulties and on families' financial situation and expenditure relies on survey data from Understanding Society and a considerably smaller sample than the other outcomes that rely on administrative data for the whole population. These estimates are therefore less precise, more sensitive to sampling variability and have limited power to detect small effects.

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