Education Endowment Foundation

The National School Breakfast Programme

Technical Notes

To accompany the Evaluation Report

THE BEHAVIOURAL INSIGHTS TEAM

The Education Endowment Foundation (EEF) is an independent grant-making charity dedicated to breaking the link between family income and educational achievement, ensuring that children from all backgrounds can fulfil their potential and make the most of their talents.

The EEF aims to raise the attainment of children facing disadvantage by:

- identifying promising educational innovations that address the needs of disadvantaged children in primary and secondary schools in England;
- evaluating these innovations to extend and secure the evidence on what works and can be made to work at scale; and
- encouraging schools, government, charities, and others to apply evidence and adopt innovations found to be effective.

The EEF was established in 2011 by the Sutton Trust as lead charity in partnership with Impetus Trust (now part of Impetus - Private Equity Foundation) and received a founding £125m grant from the Department for Education. Together, the EEF and Sutton Trust are the government-designated What Works Centre for improving education outcomes for school-aged children.

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Technical Appendix A: School Recruitment Regressions

This Appendix contains details of the school recruitment analysis which appears in the subsection "Recruitment and reach:" first, details of the data cleaning; second, details of the regression specification; third, detailed regression results.

Data cleaning

The data cleaning rules are the same as in Appendix B aside from these differences:

- Only schools that are ineligible for the programme are excluded (5 schools, giving a sample of 2,053 schools).
- When imputing income per pupil in 2018 and 2019, a binary indicator for enrolment is added as a predictor and indicators for models of provision are removed.
- The number of pupils in GIAS data is used as a covariate. For the 3 schools which are missing this information, the number of pupils is taken to be their school capacity (from GIAS data).

Regression specification

In the study plan, it was specified that machine learning models would be used to identify the most important predictors of enrolment if enrolment was below 90% of contacted schools. 88.0% of (eligible) contacted schools enrolled. Since this is close to the 90% threshold and it is clear from the regression results below that one covariate (aside from geographical region) is an especially strong predictor of enrolment, it was judged that machine learning techniques would add little insight.

The following regression was specified in the study plan:

$$Y_i = \alpha + \beta_1 FSM_i + \beta_2 log(1 + SFP_i) + \beta_3 type_i + \beta_4 whitebritish_i + \beta_5 region_i + \beta_6 log(numpupils_i) + u_i$$

where:

- Y_i is a binary indicator for enrolment for school i
- FSM_i is the proportion of FSM pupils
- SFP_i is the revenue balance in £ at the end of the last financial year
- $type_i$ is the type of school
- $whitebritish_i$ is the proportion of white British students
- $region_i$ is the region of England
- $numpupils_i$ is the number of pupils
- u_i is an error term

Given the data available, the following changes were made to the set of covariates:

- Remove $whitebritish_i$ as a covariate (since data on the proportion of White British students are not available at the school level)
- Split $type_i$ into two categorical variables: one for stage of education (primary, secondary, other) and one for school type (academy, community school, foundation school, pupil referral unit, voluntary school)
- Use $numpupils_i$ instead of $log(numpupils_i)$ as a covariate for ease of interpretability (using $log(numpupils_i)$ makes very little difference to the main conclusions from the analysis)

As specified in the study plan, heteroskedasticity-robust standard errors were used (since the outcome is binary, our standard errors would otherwise be incorrect). A logistic regression with the same covariates was used as a robustness check.

Results

Table A1: Regression **output from predicting enrolment**

	(1) **Linear model (OLS)**	**(2)** **Logit model**
Proportion of FSM pupils	0.255** (0.067)	2.788** (0.740)
Difference in income per pupil between 2018 and 2019 (£ '000s)	0.001 (0.002)	0.016 (0.038)
Secondary school	0.044* (0.021)	0.525+ (0.272)
Other phase of education	0.048 (0.034)	0.686 (0.525)
Community school	-0.034* (0.017)	-0.312+ (0.164)
Foundation school	-0.048 (0.024)	-0.498 (0.336)
Pupil referral unit	-0.038 (0.047)	-0.047 (1.081)
Voluntary school	-0.036 (0.023)	-0.333 (0.206)
East Midlands and the Humber	-0.044+ (0.024)	-0.499+ (0.256)
East of England and North-East London	-0.027 (0.027)	-0.292 (0.283)
North of England	-0.029 (0.025)	-0.330 (0.303)
North-West London and South-Central England	-0.023 (0.028)	-0.251 (0.294)
South-East England and South London	-0.060* (0.024)	-0.611** (0.232)
South-West England	-0.029 (0.032)	-0.342 (0.347)
West Midlands	-0.092** (0.026)	-0.893** (0.232)
Number of pupils (00s)	-0.006+ (0.003)	-0.067* (0.032)
Constant	0.881** (0.033)	2.048** (0.323)
(Pseudo) R-squared	0.016	0.035

Notes: Reference categories are primary schools for education phase, academy for school type, and Lancashire and West Yorkshire for region; standard errors in parentheses; ** p<0.01, * p<0.05, + p<0.1.

Technical Appendix B: Matching Estimation for Attendance Outcomes

This Appendix contains details of the matching analysis, the results of which appear in the subsection "What were the levels of attendance at school and attendance at breakfast provision among the different delivery models? ". The structure of this Appendix is as follows:

- Data sources,
- Imputation methods used on the data,
- Outcome measures used,
- Matching methodology,
- Regression specification,
- Results of balance checks and a regression analysis check.

Data sources

School-level variables were taken from the following data sources:

Table B1: Data sources

Data source	Variables used for imputation / as covariates	Notes
FAMB data on recruited schools, recruitment visits and breakfast visits	• Models of provision • Number of pupils on roll at recruitment visit • Number of pupils served by prior breakfast provision (as observed in recruitment visit) • Planning/launch visit date • Breakfast visit date • Number of pupils on roll at breakfast visit • Number of pupils served at breakfast visit	Sent 2 June 2020.
Get Information About Schools (GIAS) - all establishment data (link)	• Phase of education • School type • Postcode area • Percent of pupils eligible for FSM • Number of pupils • Urbanicity • Ofsted rating from last visit • Statutory low / high age	Downloaded 17 June 2020. School type is in five categories (academy, community, foundation, pupil referral unit, voluntary). (Urbanicity of English schools is presented in eight categories, which were initially coarsened to six (rural hamlet and isolated dwellings, rural village (in a sparse setting or not), rural town and fringe (in a sparse setting or not), urban city and town, urban minor conurbation, urban major conurbation). The study plan stated that schools would be classified urban, rural or coastal, but BIT could not find a dataset that used such a system.
Opportunity areas selection data (link)	• Whether district containing school is in opportunity area	Linked to schools through GIAS data.
Financial returns (link)	• Income per pupil 2015/16/17/18/19 • Number of pupils in 2019 financial returns data	LA maintained schools submit Consistent Financial Reporting (CFR) returns, which cover April - March. Academies submit academies accounting returns (AARs), which cover September - August.
Pupil absence	• Percent attendance over	The periods are:

statistics (link)	various periods ● Total number of possible attendance sessions over various periods ● Number of pupils aged 5-15 in absence statistics for academic year 2018-19	● Academic years 2016-17, 2017-18 and 2018-19 ● Autumn / spring terms for academic years 2016-17, 2017-18 and 2018-19 ● Autumn term for academic years 2017-18, 2018-19 and 2019-20

Imputation

123 schools out of the 1,809 in recruited schools data were omitted because their form of provision is missing (71 schools have no recorded breakfast visit, 52 schools have no form of provision recorded during their breakfast visit).

178 (10.6%) of the remaining schools are not linked with an Ofsted rating in GIAS data. Missing values were filled in manually where appropriate (e.g. if a recent inspection has taken place) and otherwise take the latest inspection grade from the school's old DfE URN (e.g. for schools converted into academies). Three schools were dropped which have never had an Ofsted inspection, resulting in a sample of 1,683 schools.

Three schools are missing percent of FSM pupils. These missing values were filled in manually using publicly available information (e.g. school websites). 94 schools do not have a defined phase of education in GIAS data; such schools are classified as primary if their statutory high age is less than or equal to 13, as secondary if their statutory low age is at least 11, and as other if neither of these conditions are satisfied.

There are three fields in the breakfast visit data related to the number of pupils served: the number of pupils served by a breakfast club, the (estimated) number of pupils served by alternative provision and the (estimated) number of pupils served overall. Some of the entries in the second field also break down provision by model type (including breakfast club). Based on these entries, there appear to be some errors in the fields identifying models of provision, which were corrected. There are also errors in some of the entries themselves (e.g. the sum of pupils served by breakfast club and alternative provision exceeds the total). The following rules were applied when cleaning the data:

- Replace the overall number of pupils served with the number of pupils served by a breakfast club if overall provision is missing and there is no recorded alternative provision.
- Fill in missing or zero values for the overall number of pupils served with the sum of the numbers served by a breakfast club and alternative provision.
- Transform the overall number of pupils served into a missing value if the entry in the field for the number of pupils served by alternative provision suggests that the number served at alternative provision was not recorded (this only applies to 3 schools).

To account for the uncertainty in other variables with missingness, multiple imputation (MI) was performed, creating 25 imputed datasets and pooling the estimates from each. Imputation was done via predictive mean matching, using 3 nearest neighbours and 10 burn-in iterations.

Table B2: Description of missing variables

Variable(s) imputed	Number missing (%)	Variables used to impute
Planning / launch visit date	21 (1.2 %)	● Date partner agreement signed ● Recruitment visit date ● Breakfast visit date
Number of pupils aged 5-15 in absence statistics for academic year 2018-19	41 (2.4 %)	● Number of pupils on roll at recruitment visit ● Number of pupils on roll at breakfast visit ● Number of pupils in GIAS data ● Number of pupils in 2019 financial returns

		data
Number of pupils on roll at breakfast visit	65 (3.9 %)	• Number of pupils on roll at recruitment visit • Number of pupils in GIAS data • Number of pupils in 2019 financial returns data • Number of pupils aged 5-15 in absence statistics for academic year 2018-19
Income per pupil over various periods	• Income per pupil 2018: 38 (2.3 %) • Income per pupil 2019: 26 (1.5 %)	• Income per pupil in all other periods • Number of pupils in 2019 financial returns data • Models of provision • Phase of education • School type • Postcode area • Ofsted rating
Percent pupils served at breakfast visit	148 (8.8 %)	• Percent pupils served by breakfast club (at breakfast visit) • Percent pupils served by prior breakfast provision • Number of pupils on roll at breakfast visit • Term of breakfast visit • Models of provision
Percent pupils served by prior breakfast provision	51 (3.0 %)	• Percent pupils served at breakfast visit • Percent pupils served by breakfast club (at breakfast visit) • Number of pupils on roll at breakfast visit • Term of breakfast visit • Models of provision
Percent attendance over various periods	• 2016-17 academic year: 225 (13.4 %) • 2017-18 academic year: 96 (5.7 %) • 2018-19 academic year: 41 (2.4 %) • Autumn / spring terms for academic year 2016-17: 231 (13.7 %) • Autumn / spring terms for academic year 2017-18: 113 (6.7 %) • Autumn / spring terms for academic year 2018-19: 41 (2.4 %) • Autumn term for academic year 2017-18: 121 (7.2 %) • Autumn term for academic year 2018-19: 45 (2.7 %) • Autumn term for academic year 2019-20:	• Percent of absence in all other periods • Number of pupils aged 5-15 in absence statistics for academic year 2018-19 • Models of provision • School type • Postcode area

	85 (5.1 %)	
Number of possible attendance sessions over various periods	Same as percent attendance above (for the same period)	● Number of possible attendance sessions in all other periods ● Number of pupils aged 5-15 in absence statistics for academic year 2018-19 ● form of provision ● School type ● Postcode area

Percent pupils served at breakfast visit or by prior breakfast provision for a school was only imputed if its number of pupils served is missing. If a school only has a missing value for its number of pupils (at the relevant date), this was imputed and then the percentage of pupils served was calculated using the imputed value and the (observed) number of pupils served. So the percentage of pupils served at the breakfast visit was imputed for 90 schools (5.3 %) and the percentage served by prior provision was imputed for 40 schools (2.4%).

To calculate the term of breakfast visit, the following periods were used:

- Any date before 3 January 2019: autumn term 2018-19,
- 3 January 2019 - 22 April 2019: spring term 2018-19,
- 23 April 2019 - 2 September 2019: summer term 2018-19,
- 3 September 2019 onwards: autumn term 2019-20.

The earliest breakfast visit date is 17 September 2018. The latest breakfast visit date is 6 February 2020, but only 4 schools received a breakfast visit in 2020 so these were allocated to autumn term 2019-20.

After performing MI, the following variables were calculated in each imputed dataset:

- Difference in income per pupil between 2018 and 2019,
- Term of launch, by comparing the planning / launch visit date to the following:
    - Any date before 4 September 2018: summer term 2017-18,
    - 4 September 2018 - 2 January 2019: autumn term 2018-19,
    - 3 January 2019 - 22 April 2019: spring term 2018-19,
    - 23 April 2019 onwards: summer term 2018-19.

  Note that the earliest planning/launch visit date is 14 May 2018 and the latest date is 5 September 2019 (the next latest date is 24 July 2019, so they were allocated the corresponding school to summer term 2018-19).
- Percent of pupils served at breakfast visit,
- Percent of pupils served by prior breakfast provision,
- Percent attendance at school between the next term after launch and autumn term 2019-20,
- Percent attendance at school over the three terms before the term of launch.

Outcome measures

The following two outcome measures were examined:

- Percent attendance at school,
- Percent of pupils served at breakfast visit.

Percent attendance at school is calculated for pupils aged 5-15 (i.e. of compulsory school age). The percent of pupils served at the breakfast visit is equal to the number of pupils served divided by the number of pupils on the school's roll.

In the study plan, BIT specified cost of provision as an outcome in our quantitative analysis. Since the response rate by schools to our survey was lower than expected (184 responses which were suitable for analysis), cost of provision is only analysed in the cost analysis section.

Matching methodology

In the study plan, two analyses were specified. Coarsened exact matching (CEM, from Iacus, King and Porro 2012) is used to reduce selection bias:

- **Analysis I**: having a formal breakfast club (with or without alternative provision) vs. alternative provision only,
- **Analysis II**, which is split into:
    - II.1: having a formal breakfast club only vs. alternative provision only,
    - II.2: having a formal breakfast club only vs. both types of provision (breakfast club and alternative provision),
    - II.3: having both types of provision vs. alternative provision only.

CEM involves coarsening a set of matching variables into categorical ones and then exact matching on the categorical versions. For example, consider two groups; a school in group 1 is matched with a school in group 2 if both schools are in the same category for all matching variables (i.e. the same "stratum"). Any school in group 1 which fails to match with at least one school in group 2 is dropped, and vice versa. One of the two groups is classified as the treatment group, and the other group is classified as the comparator group (which is intended to act as a counterfactual for the treatment group). The matched schools are also weighted as follows: let n be the number of possible attendance sessions for the percent attendance at school outcome, and the number of pupils for the percent pupils served outcome. Matched treatment schools receive a weight of:

$$\frac{n}{average\ n\ over\ all\ matched\ treatment\ schools}$$

Matched comparator schools receive a weight of:

$$\frac{sum\ of\ weights\ for\ treatment\ schools\ in\ same\ stratum\ *\ n}{sum\ of\ n\ for\ comparator\ schools\ in\ same\ stratum} * \frac{total\ number\ of\ matched\ comparator\ schools}{total\ number\ of\ matched\ treatment\ schools}$$

This is similar to the formula in standard CEM cases:

$$\frac{number\ of\ treatment\ schools\ in\ same\ stratum}{number\ of\ comparator\ schools\ in\ same\ stratum} * \frac{total\ number\ of\ matched\ comparator\ schools}{total\ number\ of\ matched\ treatment\ schools}$$

However, the weights of matched comparator schools in the same stratum can differ (in proportion to their total number of pupils).

Note that it is inappropriate to use a weight equal to the product of n and a school's CEM weight. This is because schools in the comparator group are supposed to act as counterfactuals for schools in the treatment group, so their absolute n's are unimportant. For example, if a CEM stratum contains one school in the comparator group and one school in the treatment group with 100 pupils, the pupils in the comparator school are supposed to represent 100 pupils, whether the school itself contains 10 pupils or 10,000 pupils. Conversely, if two comparator schools are supposed to act as counterfactuals for a treatment school, the comparator school with higher n should receive a greater weight (because it contains more information).

Unmatched schools receive a weight of 0. The average weight for a matched school in the treatment group or the comparator group is 1, so both the *aweight* or *iweight* options will give the same estimated coefficients and standard errors with *regress* commands in Stata.

Analysis II involves three groups; as suggested by Iacus, King and Porro (2012), CEM is performed separately on each pair of groups. For each pairwise comparison, the group which has either (i) more of an alternative provision element or (ii) less of a breakfast club element is assigned as the treatment group.

Table B3: Classifying comparator and treatment groups for CEM

Analysis	Comparator group	Treatment group
I: breakfast club (with or without alternative provision) vs. alternative provision only	Breakfast club (with or without alternative provision)	Alternative provision only
II.1: breakfast club only vs. alternative provision only	Breakfast club only	Alternative provision only
II.2: breakfast club only vs. both types	Breakfast club only	Both types
II.3: both types vs. alternative provision only	Both types	Alternative provision only

The difference in the income received by a school per pupil between 2018 and 2019 was used as a proxy for a school's financial position.

In addition to the matching variables specified in the study plan, the following extra variables were used:

- the term of breakfast visit for the percent pupils served outcome (since the time of year may affect attendance at breakfast and may be correlated with the choice of provision model), and
- the term of launch for the percent attendance at school outcome (since attendance varies over the school year).

Including these new variables as matching variables will reduce the precision of our estimates (because they lead to fewer matched schools), so three categories were used instead of four for the other continuous matching variables.

It was found that being located in an opportunity area is very weakly associated with the form of provision and both outcomes (after controlling for the other matching variables), so it was not used as a matching variable.

See Table B4 for a list of matching variables. Each matching variable is used in CEM for both outcomes unless otherwise specified.

Table B4: Description of matching variables

Matching variable	Categories used in CEM	Notes
Percent of FSM pupils	Less than 20%, 20-35%, more than 35%	Categories are based on a deprivation and education report published by the Department for Children, Schools and Families (2009). They present 5 groups, but the top and bottom 2 groups were grouped into single categories.
Percent attendance at school over the three terms before the term of launch	Less than 93%, 93-95%, more than 95%	Used as matching variable for percent attendance at school outcome only
Percent of pupils served by prior breakfast provision	Less than 5%, 5-15%, more than 15%	Used as matching variable for percent pupils served outcome only
Difference in income per pupil between 2018 and 2019	Less than -£300, between -£300 and £300, more than £300	
Phase of education	Primary, secondary, other	
Urbanicity	Urban, rural	Schools in an urban minor conurbation or urban

		major conurbation were defined as urban; the rest were defined as rural.
Number of pupils aged 5-15 in absence statistics for academic year 2018-19	Less than 200, 200-400, more than 400	Used as matching variable for percent attendance at school outcome only
Number of pupils on roll at breakfast visit	Less than 200, 200-400, more than 400	Used as matching variable for percent pupils served outcome only
Ofsted grade	Good / outstanding, requires improvement / inadequate	
Term of launch	Summer term 2017-18, autumn term 2018-19, spring term 2018-19, summer term 2018-19	Used as matching variable for percent attendance at school outcome only
Term of breakfast visit	Autumn term 2018-19, spring term 2018-19, summer term 2018-19, autumn term 2019-20	Used as matching variable for percent pupils served outcome only

It is possible that a school with missing values is assigned to different strata in different imputed datasets. For such a school, the stratum to which it is most often assigned over the 25 imputations is observed (with ties broken at random) and then imposed in all imputed datasets. This is performed by the *cem* command in Stata. Note that it is also possible that two schools fall into the same strata for one outcome and not the other in the same imputed dataset (since the set of matching variables differs slightly for the two outcomes).

Regression specification

After matching, the impact of provision in the treatment group relative to provision that defines the comparator group on percent attendance at school was estimated via OLS using the following specification:

$$percent.attendance_i = \alpha + \beta T_i + u_i$$

Here $percent.attendance_i$ is percent attendance at school i, T_i is 1 if i is in the treatment group and 0 if i is in the comparator group. Results are pooled from each imputed dataset using Rubin's rules.

Similarly, the impact of the treatment provision was estimated relative to the control provision with the following specification:

$$percent.served_i = \alpha + \beta T_i + u_i$$

Here $percent.served_i$ is percent of pupils who attended breakfast at the breakfast visit at school i.

As a robustness check for each outcome, the (non-coarsened) matching variables were added as covariates. This may result in predicted values that are outside [0,1] range, but BIT still prefer a linear model to a quasi-binomial model because of its interpretability. Very few predicted values are observed outside of the [0,1] range.

The likelihood of making false discoveries increases as the number of comparisons made increases - i.e. as the number of outcomes increases and as the number of groups to be compared increases. The Benjamini-Hochberg procedure is applied to correct for multiple comparisons separately for analysis I (2 comparisons) and analysis II (6 comparisons). This limits the false discovery rate (the expected proportion of discoveries that are false) for each piece of analysis at the significance threshold specified.

Balance checks

For each analysis, this section presents the (weighted) means of all matching variables in the treatment and comparator groups before and after matching, pooled across the imputed datasets. For variables related to the number of pupils, the pre-matching means are unweighted and the post-matching means are weighted by standard CEM weights. For variables that are continuous before coarsening, summary statistics are presented for the non-coarsened variables. For variables that are categorical before coarsening, summary statistics are presented for the coarsened variables.

Differences in means between the groups were tested for using two-sample t-tests. It is important to note that differences in means could become statistically non-significant after matching solely because of the smaller sample size. The change in the absolute difference in means between the groups is more relevant when judging how well matching has enforced balance.

The matching process increases imbalance on the difference in income per pupil between 2018 and 2019, but this reflects the high standard deviation for this variable (£2,593.70 across the imputed datasets, compared to a mean of £234.09) rather than some issue with the code. As a result, there is no statistical evidence for imbalance on this variable even though there are large proportionate differences in its average values between matched groups (it should be highlighted that the difference in income can be negative). Note that there is not always perfect balance on the term of launch because the stratum to which a school is most often assigned in all datasets is imposed, even if the imputed values in a certain dataset correspond to a different stratum.

Table B5: Balance checks - analysis I (any breakfast club vs. alternative provision only)

Outcome: percent attendance at school				
Stage of analysis	**Before matching**		**After matching**	
Group	**Any breakfast club**	**Alternative provision only**	**Any breakfast club**	**Alternative provision only**
Percent of FSM pupils	27.18%	26.96%	26.07%	26.05%
Previous attendance rate at school	94.58%	94.17%**	94.28%	94.33%
Difference in income per pupil between 2018 and 2019	£260.48	£270.45	£83.12	£229.88
Primary school	62.39%	35.60%**	42.07%	42.07%
Secondary school	31.37%	54.33%**	50.57%	50.57%
Other phase of education	6.24%	10.07%*	7.36%	7.36%
Urban	49.82%	43.91%*	41.96%	41.96%
Number of pupils aged 5-15 for academic year 2018-19	360.94	423.90**	460.88	437.96
Ofsted grade: good / outstanding	74.92%	71.36%	71.33%	71.33%

Term of launch: summer term 2017-18	8.86%	7.06%	2.58%	2.52%
Term of launch: autumn term 2018-19	48.63%	48.88%	50.47%	50.70%
Term launch: spring term 2018-19	41.96%	42.14%	46.29%	46.12%
Term launch: summer term 2018-19	0.55%	1.92%*	0.65%	0.65%
Outcome: percent of pupils served				
Stage of analysis	**Before matching**		**After matching**	
Group	**Any breakfast club**	**Alternative provision only**	**Any breakfast club**	**Alternative provision only**
Percent of FSM pupils	26.72%	26.32%	23.92%	23.92%
Percent of pupils served by prior breakfast provision	7.07%	4.36%**	4.96%	4.20%*
Difference in income per pupil between 2018 and 2019	£231.90	£293.57	£324.11	£366.82
Primary school	67.03%	40.71%**	49.51%	49.51%
Secondary school	29.67%	53.19%**	49.68%	49.68%
Other phase of education	3.30%	6.09%*	0.81%	0.81%
Urban	50.45%	45.87%	43.96%	43.96%
Number of pupils on roll at breakfast visit	406.88	459.70**	500.05	474.06
Ofsted grade: good / outstanding	75.97%	72.80%	79.43%	79.43%
Term of breakfast visit: autumn term 2018-19	0.93%	0.74%	0.00%	0.00%
Term of breakfast visit: spring term 2018-19	20.77%	21.92%	14.20%	14.20%
Term of breakfast visit: summer term 2018-19	71.06%	64.54%*	81.25%	81.25%
Term of breakfast visit: autumn term 2019-20	7.24%	12.79%**	4.55%	4.55%

Notes: ** p<0.01, * p<0.05, $^{+}$ p<0.1 reflect the results of two-sample t-tests.

Table B6: Balance checks - analysis II.1 (breakfast club only vs. alternative provision only)

Outcome: percent attendance at school				
Stage of analysis	**Before matching**		**After matching**	
Group	**Breakfast club only**	**Alternative provision only**	**Breakfast club only**	**Alternative provision only**
Percent of FSM pupils	26.56%	26.96%	24.28%	24.05%
Previous attendance rate at school	94.14%	94.17%	94.43%	94.44%
Difference in income per pupil between 2018 and 2019	£309.34	£270.45	£39.16	£165.87
Primary school	26.36%	35.60%*	35.70%	35.70%
Secondary school	71.37%	54.33%**	64.22%	64.22%
Other phase of education	2.26%	10.07%**	0.08%	0.08%
Urban	61.16%	43.91%**	44.93%	44.93%
Number of pupils aged 5-15 for academic year 2018-19	493.36	423.90*	496.23	492.45
Ofsted grade: good / outstanding	68.91%	71.36%	81.57%	81.57%
Term of launch: summer term 2017-18	12.15%	7.06%*	2.15%	2.15%
Term of launch: autumn term 2018-19	39.48%	48.88%*	46.83%	46.83%
Term of launch: spring term 2018-19	48.04%	42.14%	50.80%	50.80%
Term of launch: summer term 2018-19	0.33%	1.92%**	0.21%	0.21%
Outcome: percent of pupils served				
Stage of analysis	**Before matching**		**After matching**	
Group	**Breakfast club only**	**Alternative provision only**	**Breakfast club only**	**Alternative provision only**
Percent of FSM pupils	25.53%	26.32%	23.05%	23.20%

Percent of pupils served by prior breakfast provision	5.32%	4.36%*	4.87%	4.22%
Difference in income per pupil between 2018 and 2019	£201.41	£293.57	£256.02	£294.78
Primary school	29.24%	40.71%**	36.68%	36.68%
Secondary school	70.12%	53.19%**	63.26%	63.26%
Other phase of education	0.64%	6.09%**	0.07%	0.07%
Urban	62.55%	45.87%**	45.74%	45.74%
Number of pupils on roll at breakfast visit	529.18	459.70*	575.35	549.84
Ofsted grade: good / outstanding	70.64%	72.80%	79.15%	79.15%
Term of breakfast visit: autumn term 2018-19	1.06%	0.74%	0.00%	0.00%
Term of breakfast visit: spring term 2018-19	18.14%	21.92%	13.02%	13.02%
Term of breakfast visit: summer term 2018-19	75.33%	64.54%**	86.01%	86.01%
Term of breakfast visit: autumn term 2019-20	5.47%	12.79%**	0.98%	0.98%

Notes: ** p<0.01, * p<0.05, $^{+}$ p<0.1 reflect the results of two-sample t-tests

Table B7: Balance checks - analysis II.2 (breakfast club only vs. both types)

Outcome: percent attendance at school				
Stage of analysis	**Before matching**		**After matching**	
Group	**Breakfast club only**	**Both types**	**Breakfast club only**	**Both types**
Percent of FSM pupils	26.56%	27.41%	24.86%	25.00%
Previous attendance rate at school	94.14%	94.74%**	95.09%	94.97%
Difference in income per pupil between 2018 and 2019	£309.34	£242.55	£258.39	£203.52
Primary school	26.36%	75.57%**	75.61%	75.61%
Secondary school	71.37%	16.74%**	24.39%	24.39%

Other phase of education	2.26%	7.70%**	0.00%	0.00%
Urban	61.16%	45.67%**	40.42%	40.42%
Number of pupils aged 5-15 for academic year 2018-19	493.36	328.99**	306.13	309.77
Ofsted grade: good / outstanding	68.91%	77.12%**	89.97%	89.97%
Term of launch: summer term 2017-18	12.15%	7.65%*	3.97%	3.98%
Term of launch: autumn term 2018-19	39.48%	51.98%**	49.78%	49.77%
Term of launch: spring term 2018-19	48.04%	39.74%**	46.20%	46.20%
Term of launch: summer term 2018-19	0.33%	0.62%	0.06%	0.06%
Outcome: percent of pupils served				
Stage of analysis	**Before matching**		**After matching**	
Group	**Breakfast club only**	**Both types**	**Breakfast club only**	**Both types**
Percent of FSM pupils	25.53%	27.13%*	25.75%	25.83%
Percent of pupils served by prior breakfast provision	5.32%	7.66%**	7.95%	7.30%
Difference in income per pupil between 2018 and 2019	£201.41	£242.22	£239.93	£165.51
Primary school	29.24%	79.82%**	75.25%	75.25%
Secondary school	70.12%	15.98%**	24.75%	24.75%
Other phase of education	0.64%	4.20%**	0.00%	0.00%
Urban	62.55%	46.36%**	46.68%	46.68%
Number of pupils on roll at breakfast visit	529.18	377.38**	378.70	388.82
Ofsted grade: good / outstanding	70.64%	77.77%**	85.71%	85.71%
Term of breakfast visit: autumn term 2018-19	1.06%	0.88%	0.13%	0.13%

Term of breakfast visit: spring term 2018-19	18.14%	21.67%	12.00%	12.00%
Term of breakfast visit: summer term 2018-19	75.33%	69.61%*	86.82%	86.82%
Term of breakfast visit: autumn term 2019-20	5.47%	7.84%	1.05%	1.05%

Notes: ** p<0.01, * p<0.05, $^{+}$ p<0.1 reflect the results of two-sample t-tests

Table B8: Balance checks - analysis II.3 (both types vs. alternative provision only)

Outcome: percent attendance at school				
Stage of analysis	**Before matching**		**After matching**	
Group	**Both types**	**Alternative provision only**	**Both types**	**Alternative provision only**
Percent of FSM pupils	27.41%	26.96%	25.64%	25.84%
Previous attendance rate at school	94.74%	94.17%**	94.40%	94.46%
Difference in income per pupil between 2018 and 2019	£242.55	£270.45	£117.95	£243.24
Primary school	75.57%	35.60%**	48.82%	48.82%
Secondary school	16.74%	54.33%**	42.65%	42.65%
Other phase of education	7.70%	10.07%	8.53%	8.53%
Urban	45.67%	43.91%	41.24%	41.24%
Number of pupils aged 5-15 for academic year 2018-19	328.99	423.90**	434.15	415.93
Ofsted grade: good / outstanding	77.12%	71.36%*	74.84%	74.84%
Term of launch: summer term 2017-18	7.65%	7.06%	1.76%	1.69%
Term of launch: autumn term 2018-19	51.98%	48.88%	49.15%	49.15%
Term of launch: spring term 2018-19	39.74%	42.14%	48.49%	48.55%
Term of launch: summer term 2018-19	0.62%	1.92%*	0.61%	0.61%

Outcome: percent of pupils served				
Stage of analysis	**Before matching**		**After matching**	
Group	**Both types**	**Alternative provision only**	**Both types**	**Alternative provision only**
Percent of FSM pupils	27.13%	26.32%	23.61%	23.59%
Percent of pupils served by prior breakfast provision	7.66%	4.36%**	5.20%	4.34%*
Difference in income per pupil between 2018 and 2019	£242.22	£293.57	£275.86	£312.76
Primary school	79.82%	40.71%**	55.49%	55.49%
Secondary school	15.98%	53.19%**	43.64%	43.64%
Other phase of education	4.20%	6.09%	0.87%	0.87%
Urban	46.36%	45.87%	41.96%	41.96%
Number of pupils on roll at breakfast visit	377.38	459.70**	479.09	458.39
Ofsted grade: good / outstanding	77.77%	72.80%*	81.26%	81.26%
Term of breakfast visit: autumn term 2018-19	0.88%	0.74%	0.00%	0.00%
Term of breakfast visit: spring term 2018-19	21.67%	21.92%	11.85%	11.85%
Term of breakfast visit: summer term 2018-19	69.61%	64.54%$^{+}$	83.29%	83.29%
Term of breakfast visit: autumn term 2019-20	7.84%	12.79%**	4.86%	4.86%

Notes: ** p<0.01, * p<0.05, $^{+}$ p<0.1 reflect the results of two-sample t-tests

Pre-matching robustness check

Regressions were performed on the imputed datasets before matching, using the matching variables as covariates and the number of possible attendance sessions and number of pupils as analytical weights for the percent attendance at school and percent pupils served outcomes respectively. This is used as a robustness check because of the need to check whether the results were driven by the schools from the matching analysis.

The Benjamini-Hochberg procedure is used to correct for multiple comparisons in the same way as in the post-matching regressions.

Table B9: Results of controlled regression analysis

Outcome: percent attendance at school				
Analysis: comparator vs. treatment	**I: any breakfast club vs. alternative provision only**	**II.1: breakfast club only vs. alternative provision only**	**II.2: breakfast club only vs. both types**	**II.3: both types vs. alternative provision only**
Sample size	**1,683**	**597**	**1,348**	**1,421**
Mean for comparator group	94.45%	93.97%	93.97%	94.63%
Estimated treatment effect	-0.03pp (0.05)	-0.00pp (0.07)	-0.02pp (0.05)	-0.04pp (0.05)
R-squared	0.812	0.828	0.798	0.814
Outcome: percent of pupils served				
Analysis: comparator vs. treatment	**I: any breakfast club vs. alternative provision only**	**II.1: breakfast club only vs. alternative provision only**	**II.2: breakfast club only vs. both types**	**II.3: both types vs. alternative provision only**
Sample size	**1,683**	**597**	**1,348**	**1,421**
Mean for comparator group	40.61%	13.37%	13.37%	49.83%
Estimated treatment effect	2.11pp (1.37)	13.32pp** (1.53)	20.22pp** (1.62)	-1.08pp (1.48)
R-squared	0.478	0.484	0.506	0.478

Notes: Standard errors in round brackets; ** p<0.01, * p<0.05, $^{+}$ p<0.1 (multiplicity-adjusted p-values)

Additionally, regression analysis was performed for schools that have a maximum of one model of alternative provision (they may or may not have a breakfast club), using schools with a breakfast club and no alternative provision as the reference group. The Benjamini-Hochberg procedure is applied to correct for 16 comparisons across the 2 outcomes.

Table B10: Results of controlled regression analysis - schools with a maximum of one alternative model of provision

	Outcome: percent attendance at school	**Outcome: percent of pupils served**
Mean for schools with breakfast club only	93.97%	13.37%
Estimated effect of playground model only	-0.08pp (0.13)	19.67pp** (3.42)
Estimated effect of breakfast club + playground model	-0.03pp (0.08)	21.64pp** (1.94)
Estimated effect of grab-and-go model only	0.01pp (0.08)	6.52pp** (2.08)

Estimated effect of breakfast club + grab-and-go model	0.03pp (0.08)	12.47pp** (1.94)
Estimated effect of classroom model only	-0.09pp (0.11)	38.81pp** (2.58)
Estimated effect of breakfast club + classroom model	-0.04pp (0.07)	40.00pp** (1.76)
Estimated effect of other alternative provision only	0.05pp (0.11)	2.00pp (2.72)
Estimated effect of breakfast club + other alternative provision	-0.26pp** (0.08)	0.58pp (2.24)
R-squared	0.822	0.652

Notes: N=1,373; standard errors in round brackets; ** p<0.01, * p<0.05, ⁺ p<0.1 (multiplicity-adjusted p-values)

In this analysis, it can be seen that combining a breakfast club with an alternative provision model other than the playground, grab-and-go or classroom models leads to an estimated negative effect (of 0.26p, which is significant at the 5% level) on the attendance rate at school compared to just having a breakfast club. BIT's judgment is that this result is likely to be spurious, especially since only 61 schools have just a breakfast club and one other alternative provision model. Other than this, there are no statistically significant differences in attendance rates.

Conversely, the playground, grab-and-go and classroom models are estimated to have positive and highly significant effects (at the 1% level) on the percent of pupils served compared to having a breakfast club only. The classroom model has the greatest estimated impact at 38.8 pp, followed by the playground model. Adding a breakfast club to a grab-and-go model leads to an estimated 5.9 pp increase in the percent of pupils served, which is significant at the 5% level (correcting for 16 multiple comparisons). There are no statistically significant increases occurring from adding a breakfast club to a playground or classroom model.

Results

In Table B11 below, the school attendance results are presented. The breakfast provision results are presented in Table B12.

Table B11: Results of matching analysis - percent attendance at school

Analysis: comparator vs. treatment	**I: any breakfast club vs. alternative provision only**	**II.1: breakfast club only vs. alternative provision only**	**II.2: breakfast club only vs. both types**	**II.3: both types vs. alternative provision only**
Number of matched schools	917	262	616	768
Number matched in comparator group (% matched)	679 (50.37%)	125 (47.71%)	154 (58.78%)	554 (51.01%)
Number matched in treatment group (% matched)	238 (71.04%)	137 (40.90%)	462 (42.54%)	214 (63.88%)
Mean for comparator group	93.98%	94.06%	94.93%	94.18%

Mean for treatment group	94.13%	94.29%	94.84%	94.22%
Estimated treatment effect (no covariates)	0.15pp (0.14)	0.23pp (0.23)	-0.08pp (0.13)	0.03pp (0.14)
Estimated treatment effect (covariates)	0.09pp (0.05)	0.19pp^{+} (0.09)	0.01pp (0.05)	-0.02pp (0.05)
R-squared	0.860	0.851	0.834	0.894

Notes: Standard errors in round brackets; ** p<0.01, * p<0.05, $^{+}$ p<0.1 (multiplicity-adjusted p-values)

Table B12: Results of matching analysis - percent of pupils served breakfast

Analysis: comparator vs. treatment	**I: any breakfast club vs. alternative provision only**	**II.1: breakfast club only vs. alternative provision only**	**II.2: breakfast club only vs. both types**	**II.3: both types vs. alternative provision only**
Number of matched schools	697	218	610	573
Number matched in comparator group (% matched)	496 (36.80%)	105 (40.08%)	156 (59.54%)	391 (36.00%)
Number matched in treatment group (% matched)	201 (60.00%)	113 (33.73%)	454 (41.80%)	182 (54.33%)
Mean for comparator group	31.65%	14.88%	22.03%	37.62%
Mean for treatment group	33.47%	27.66%	47.56%	35.71%
Estimated treatment effect (no covariates)	1.83pp (2.45)	12.78pp** (3.19)	25.53pp** (2.62)	-1.91pp (2.65)
Estimated treatment effect (covariates)	1.94pp (1.66)	12.51pp** (2.41)	26.83pp** (2.14)	-1.73pp (1.81)
R-squared	0.572	0.490	0.460	0.581

Notes: Standard errors in round brackets; ** p<0.01, * p<0.05, $^{+}$ p<0.1 (multiplicity-adjusted p-values)

Technical Appendix C: Cost Analysis

Data preparation

To obtain the group of 184 schools used in the cost analysis, responses were excluded which satisfied any of the following conditions:

- Incomplete survey - 257 drops,
- No model of provision identified - 10 drops,
- Number of pupils served not recorded - one drop,
- Response from a school with multiple sites (each of which has the same URN) that does not specify the site - two drops,
- Zero personnel (staff and volunteers) involved in delivery - 13 drops,
- Other evidence of speeding from any of the funding or cost questions - five drops (which responded '1' or '100' to most of the questions about personnel costs (e.g. number of catering staff, hourly pay of catering staff in £)),
- Ratio of pupils receiving breakfast (during breakfast visit) to personnel involved in delivery of more than 100 - 13 drops.

Each of the 184 responses is from a unique school.

The survey asked schools to specify costs incurred according to a number of categories, but also included a free-text box where they could list other costs which they felt did not fall into any of the categories. Some of the costs listed were reclassified into the existing categories as appropriate. When the amount spent on an item was not provided, they were imputed using other responses or its price on Amazon (for specific products).

Survey respondents were able to indicate cost and personnel hours in different time units to secure high reliability. To get costs and personnel hours per school year, the following time unit conversion rules will be used (as in the 2016 evaluation):

- £ and hours indicated per year will not be converted,
- £ and hours indicated per month will be multiplied by 8.5,
- £ and hours indicated per week will be multiplied by 38,
- £ and hours indicated per day will be multiplied by 190,

Also, £ and hours indicated per term will be multiplied by 3.

All costs were adjusted to 2018 prices using the Office of Budget Responsibility's GDP deflator. It is assumed that set-up costs were all incurred on the recruitment visit date.

Variables were relating to each of personnel costs as follows:

- Replace total hours worked by the sum of extra paid and unpaid hours worked if total hours are below this sum (the rationale is that a respondent may have recorded total hours incorrectly before noting extra paid and unpaid hours, but did not go back and change their answer),
- Replace total hours worked and extra paid and unpaid hours by the number of personnel multiplied by the recorded value of each hours variable (the implicit assumption is that, if each member of a given personnel type works less than 0.5 hours per week, then the school accidentally recorded the total hours worked per person rather than across all people),
- Replace hourly pay below the minimum wage for 21-24 year-olds in 2019 (£7.70 in 2019 prices) as missing before identifying outliers - and then replace these missing values with the average for the remaining (non-missing) observations after outliers have been excluded.

A school was identified as an outlier for a given category of costs if its reported cost per pupil is more than 1.5 times the interquartile range below the lower quartile or above the upper quartile for non-zero / non-missing values. In our study plan, outliers were defined as values more than twice the interquartile range from the mean. However, for some cost categories with a few large values (e.g. training and recruitment, where a few larger schools hired an individual

to run the programme), this leads to a very large proportion of non-zero values being outliers. It also seems intuitively undesirable to label the median (non-zero) value as an outlier. Note that the only outliers for any cost category were above the upper quartile for that category - so very low, positive values were never classified as outliers (which could otherwise be seen as problematic, given that zero-values are never classified as outliers).

To calculate costs per pupil, total costs across all non-outlier schools were divided by the total number of pupils across all non-outlier schools. To calculate costs per school, total costs across non-outlier schools were divided by the total number of non-outlier schools. This follows the 2016 evaluation.

Finally, FAMB provided data on the costs of the programme that they incurred between 18 March 2018 and 31 March 2020. This includes the total amount spent on food and drinks (bagels, cereal and delivery) and support costs (e.g. back office support). To calculate food and drinks costs incurred by Magic Breakfast per pupil enrolled per year, the costs of bagels and cereal were converted to market prices (using a 30% discount for bagels and 60% discount for cereal). These costs were adjusted to 2018 prices by assuming that they were constant each day over the time period. The number of pupils at the breakfast visit and the planning/launch visit date was imputed (assumed to be the date at which provision started) in the same way as in the quantitative analysis and average the implied cost per pupil enrolled per year across the 25 imputed datasets. Similarly, the missing values for the number of pupils served was imputed as in the quantitative analysis by multiplying the percent of pupils served by the number of pupils at the school's breakfast visit. For the main analysis, it was assumed that FAMB incurs food and drinks costs for every school and the cost per pupil per year is constant across schools. Programme-level costs (e.g. back office support) have not been included on a per-pupil basis.

Data collection

In the original study plan, there were meant to be several waves of surveys, which were condensed into a single wave because of difficulties in finalising the wording with Magic Breakfast, as well as concerns about overburdening schools with data collection.

The analysis relies on the first survey sent (the questions for which appear below and which was sent out in July 2019, which was opened by 485 respondents, 228 of whom completed it. A second survey was sent out in January 2020 due to concerns around the hours worked variable as a robustness check, and analysis shows that the conclusions would be the same. Therefore, the original survey was defaulted back to as it was on a larger sample and unfortunately in the second survey the settings were set to anonymous so it cannot be matched back to individual schools and therefore cannot be used to calculate per-pupil costs.

The questions were:

1. What is the name of your school?
2. What is your school's Unique Reference Number (URN)? (Your URN is unique to your school and is a six digit number that can be found at the compare schools website https://www.compare-school-performance.service.gov.uk/find-a-school-in-england).
3. If you have a separate school-run breakfast provision or one that does not use NSBP food, how many pupils on average per day use that provision?
4. When do you provide the NSBP (each asked as a yes/no question):
    a. Before school day (e.g. playground bagels, before school breakfast club)
    b. At the start of, but during the school day (e.g. classroom bagels)
    c. 'Soft start' at the beginning of the school day (e.g. in a nursery)
    d. At breaktime
    e. Other, please specify.
5. How many children would you estimate pay per week for the food (and drinks) provision, not for childcare, under the National School Breakfast Programme ? If you do not charge any children for provision other than childcare, please enter 0.

6. How much pupil premium funding has been used to set up or run the breakfast provision? Please include both money spent on both fixed (e.g. fridges) or ongoing (e.g. staff) costs. Please first select the timeframe to which the amount refers and enter £0 if none has been spent. If possible, please use the yearly option.
7. How much of the school's budget -- excluding pupil premium funding -- has been used to set up or run the breakfast provision? Please include both money spent on both fixed (e.g. fridges) or ongoing (e.g. staff) costs. Please first select the timeframe to which the amount refers and enter £0 if none has been spent. If possible, please use the yearly option.
8. How much funding and in-kind support has your school received from other sources than National School Breakfast Programme (e.g. from other charities, private businesses, public funding, private donations, etc.) to set up or run the breakfast provision? Please first select the timeframe to which the amount refers and enter 0 if none has been received.
9. Please estimate approximately how much the school spent on furniture (e.g. tables) to setup the breakfast provision and enter £0 if none has been spent. Amount in £.
10. Please estimate approximately how much the school spent on resources or enrichment activities (e.g. games, sports equipment) to set up the breakfast provision and enter £0 if none has been spent. Amount in £.
11. Please estimate approximately how much the school spent on improvements to the physical environment (e.g. building a shed or improving a room to handle food) to set up the breakfast provision and enter £0 if none has been spent.
12. Please estimate approximately how much the school spent on home appliances (e.g. fridges) or other catering facilities to set up the breakfast provision and enter £0 if none has been spent.
13. Please estimate approximately how much the school spent on staff recruitment and training (e.g. hygiene training) to set up the NSBP breakfast provision and enter £0 if none has been spent.
14. Please estimate approximately how much the school spent on other items (excluding salary or ongoing costs e.g. milk) in order to deliver the breakfast provision in the NSBP and enter £0 if none has been spent. Please enter NA on the following question if you enter £0 here.
15. Please list which other things you have included as part of these costs, and preferably list the costs by item including VAT where applicable. Please write NA if you have no "other" costs, or skip this question.
16. Please estimate approximately how much the school spent on drinks/food (including fees and taxes) offered during breakfast provision, in addition to the provided free bagels and cereal. Please enter £0 if none has been spent. Please first select the timeframe to which the amount refers.
17. How much did the school spend money on an ongoing basis on other items, excluding fixed costs, salary costs and drinks/food? These are costs that you spend every week/month/term eg napkins or paper plates not items like toasters or fridges. Please enter £0 if none has been spent. Please first select the timeframe to which the amount refers.
18. This section asks about the staff costs of providing the programme per week. Please enter the amount of staff per typical week, total number of hours per typical week, paid extra working hours, cost per paid extra working hour, hours taken from other tasks and unpaid extra working hours for:
    a. Teachers
    b. Teaching Assistants
    c. Catering staff
    d. Cleaning or maintenance staff
    e. Pastoral staff
    f. Office staff
    g. Other staff
    h. Volunteers
19. What was your school budget for the previous budgetary year in £?
20. What is your school budget for this budgetary year in £?

Results

Overall summary of costs for scale-up

The results of the cost analysis for all respondent schools in the scale-up are presented in Tables C1-C3. Financial costs *per pupil enrolled* are in Table C1, financial costs *per pupil served* are in Table C2 and personnel time per pupil enrolled and per pupil served are presented in Table C3.

Table C1: Average costs per pupil enrolled - all respondent schools in scale-up

Category	Number of schools incurring (incl. outliers)	Average cost per pupil enrolled (per year) for incurrers	Average cost per pupil enrolled (per year) for all schools
Furniture	49	£1.25	£0.30
Improvements of physical environment	30	£0.87	£0.12
Catering facilities	162	£1.21	£1.07
Resources (for activities etc.)	87	£0.77	£0.32
Staff training and recruitment	58	£0.28	£0.08
Other set-up costs	88	£1.37	£0.63
Total set-up costs	173	£2.68	£2.52
Food and drinks (from the NSBP)	184	£10.40	£10.40
Food and drinks (purchased by school)	142	£1.87	£1.51
Staff salary costs (for school)	84	£7.34	£3.37
Other ongoing costs	70	£0.69	£0.30
Total ongoing costs	184	£15.58	£15.58

Table C2: Average costs per pupil served breakfast - all respondent schools in scale-up

Category	Number of schools incurring (incl. outliers)	Average cost per pupil served (per year) for incurrers	Average cost per pupil served (per year) for all schools
Furniture	49	£3.31	£0.94
Improvements of physical environment	30	£2.67	£0.45
Catering facilities	162	£3.35	£3.02
Resources (for activities etc.)	87	£2.04	£0.90

Staff training and recruitment	58	£0.89	£0.30
Other set-up costs	88	£5.16	£2.47
Total set-up costs	173	£8.47	£8.07
Food and drinks (from the NSBP)	184	£27.16	£27.16
Food and drinks (purchased by school)	142	£5.43	£4.27
Staff salary costs (for school)	84	£24.99	£11.53
Other ongoing costs	70	£2.72	£0.95
Total ongoing costs	184	£43.91	£43.91

Table C3: Average hours of personnel time used per year - all respondent schools in scale-up

Category	Number of schools incurring	Average hours per year for incurrers	Average hours per year for all schools	Average hours per pupil enrolled per year for all schools	Average hours per pupil served per year for all schools
Teachers	92	270.22	126.52	0.30	1.00
Teaching assistants	138	336.99	248.41	0.58	1.64
Total for teaching staff	170	407.67	374.93	0.88	2.64
Catering staff	57	284.32	87.01	0.21	0.55
Caretaking and maintenance staff	29	121.31	17.43	0.04	0.13
Pastoral staff	33	179.14	28.02	0.07	0.28
Office staff	42	101.65	22.34	0.05	0.14
Total for support staff	112	256.22	154.79	0.37	1.10
Volunteers	13	116.92	8.26	0.02	0.05
Other staff	32	291.33	48.02	0.12	0.24
Total for all personnel (staff and volunteers)	184	586.01	586.01	1.39	4.03

Notes: We define outliers based on personnel hours per pupil enrolled (or served) for each personnel type (e.g. teachers, teaching assistants, catering staff, volunteers).

Comparing the scale-up to the 2014-15 programme

Tables C4 and C5 compare the costs and personnel hours between schools in the scale-up and schools in the 2014-15 programme (which were supposed to run a breakfast club only). As discussed in the main report, we reweight the scale-up figures to account for the fact that a larger proportion of schools in the 2014-15 programme's intervention group were located in London.

Table C4: Average costs per pupil enrolled for scale-up compared to 2014-15 programme

Category	Average cost per pupil enrolled (per year) for schools with breakfast club model only - scale-up	Average cost per pupil enrolled (per year) for all schools - scale-up	Average cost per pupil enrolled (per year) for all schools - 2014-15 programme
Furniture	£1.82	£0.33	£0.64
Improvements of physical environment	£0.13	£0.12	£0.27
Catering facilities	£0.76	£0.99	£1.07
Resources (for activities etc.)	£0.65	£0.39	£0.49
Staff training and recruitment	£0.14	£0.11	£1.04
Other set-up costs	£1.27	£0.69	£0.04
Total set-up costs	£4.77	£2.63	£3.53
Food and drinks (from the NSBP, at market rates)	£10.40	£10.40	£10.49
Food and drinks (purchased by school in addition to NSBP food)	£1.27	£1.39	£0.98
Total ongoing costs (not including staff costs and costs unrelated to food and drinks incurred by FAMB)	£11.67	£11.79	£11.46

Table C5: Average hours of personnel time per pupil enrolled per year for scale-up compared to 2014-15 programme

Category	Average hours per pupil enrolled per year for schools with breakfast club model only - scale-up	Average hours per pupil enrolled per year for all schools - scale-up	Average hours per pupil enrolled per year for all schools - 2014-15 programme
Teachers	0.16	0.24	0.27
Teaching assistants	0.40	0.62	1.41
Total for teaching staff	0.56	0.86	1.69
Catering staff	0.31	0.19	0.10

Caretaking and maintenance staff	0.09	0.04	0.16
Pastoral staff	0.10	0.07	0.19
Office staff	0.04	0.06	0.07
Total for support staff	0.53	0.35	0.52
Volunteers	0.03	0.02	0.32
Other staff	0.08	0.14	0.06
Total for all personnel (staff and volunteers)	1.20	1.38	2.58

Comparing different models in the scale-up

Schools used various breakfast provision models (beyond just the breakfast club model), and some schools used multiple models. Tables C6 and C7 display how average costs and personnel hours respectively vary according to the types and combinations of models used. Note food and drinks costs incurred by Magic Breakfast were omitted here because we do not have this information at the school level, and assuming that it is constant across schools would be a poor approximation because certain types of provision led to far greater take-up than others.

Table C6: Average costs by type of breakfast provision

Type of breakfast provision	Number of schools	Average set-up cost per pupil enrolled for all schools	Average set-up cost per pupil served for all schools	Average ongoing cost per pupil enrolled per year for all schools - not including food and drinks from the NSBP	Average ongoing cost per pupil served per year for all schools - not including food and drinks from the NSBP
Breakfast club only	40	£3.34	£24.34	£5.27	£51.94
Alternative provision only	33	£3.15	£9.43	£3.24	£10.55
Breakfast club + playground model only	27	£2.46	£6.75	£7.69	£24.40
Breakfast club + grab-and-go model only	13	£1.33	£5.08	£5.43	£24.77
Breakfast club + classroom model only	41	£4.42	£7.35	£8.63	£12.49
Breakfast club + any other alternative provision	30	£2.15	£7.73	£2.61	£8.00
Total for	111	£2.65	£6.76	£5.26	£12.87

breakfast club + alternative provision					

Table C7: Average hours of staff time per year by type of breakfast provision

Type of breakfast provision	Number of schools	Average teaching hours per pupil enrolled per year for all schools	Average support hours per pupil enrolled per year for all schools	Average total hours per pupil enrolled per year for all schools	Average total hours per pupil served per year for all schools
Breakfast club only	40	0.60	0.42	1.14	7.85
Alternative provision only	33	0.96	0.27	1.27	4.61
Breakfast club + playground model only	27	0.61	0.26	1.13	3.20
Breakfast club + grab-and-go model only	13	0.46	0.44	1.17	4.64
Breakfast club + classroom model only	41	1.84	0.50	2.51	3.89
Breakfast club + any other alternative provision	30	0.46	0.40	0.93	2.97
Total for breakfast club + alternative provision	111	0.96	0.37	1.50	3.35

References

Iacus, S., King, G. and Porro, G. (2012). Causal Inference without Balance Checking: Coarsened Exact Matching. Political Analysis, 20(1), 1-24. doi:10.1093/pan/mpr013.

The Technical Appendices also used several Department for Education data sources:

- General information about schools (https://get-information-schools.service.gov.uk/Downloads)
- Opportunity areas (https://www.gov.uk/government/publications/social-mobility-and-opportunity-areas)
- Financial returns data (https://schools-financial-benchmarking.service.gov.uk/Help/DataSources)
- Pupil absence statistics (https://www.gov.uk/government/collections/statistics-pupil-absence)

This document is available for download at https://educationendowmentfoundation.org.uk

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