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How finance-based interventions can improve attainment at school for disadvantaged students: a review of international evidence

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ABSTRACT

The challenge of improving attainment in schools has been a longstanding issue, particularly in developing countries. This paper uses a structured review to examine causal evidence from research worldwide on the impact of finance-based interventions, including extra funding for school places, cash transfers and incentives to improve attainment in schools. The best evidence suggests that monetary incentives paid directly to students or families are the most effective strategy for raising attainment in less developed school systems. However, cash incentives may not be as effective in developed countries, where they are more useful for changing behaviour, such as completing homework, or attending classes, but not for improving attainment. This may be because students in developed countries already know how to complete homework, but may not know how to improve their test scores. The evidence for other approaches is less clear due to the lack of strong research in those areas.

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Introduction

Improving educational attainment for disadvantaged children is the holy grail in education research for many countries, but particularly so for some developing countries where school attendance is not mandated or enforced, and where attending school might entail an opportunity cost for poor families. In some countries, school attendance is not optimal, so encouraging enrolment and attendance at school can reduce the overall poverty attainment gap, although it may temporarily reduce average attainment at school if the new attendees are currently lower attaining (see Gorard et al., 2023).

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This paper summarises the results of a structured review of evidence, concerning the use of finance-based interventions to improve children's attainment at school. In this review, "attainment" refers to children's learning outcomes and includes the standard evaluation of academic performance, such as test/exam scores, but also related outcomes, such as staying on in school (retention) and graduation from a phase in schooling. "Finance-based" means that extra money is deployed for educational purposes, usually for disadvantaged students, families, schools or areas.

The policy of using targeted additional funding to try and improve student attainment is widely used internationally. It has been used by governments and other agencies for decades, where poverty is assumed to be a barrier to the attainment of academic objectives for some students (Children's World Report, 2020). There have been many variations on the theme, with money given to the school system to deploy, or to areas with high levels of disadvantage, to families either for them to deploy or as an incentive (so that parents encourage school attendance, for example), to teachers, or to the disadvantaged students themselves (Toutkoushian & Michael, 2007).

While the function and objectives of cash transfers are generally the same, the implementation and delivery has differed substantially between studies. In some studies, the magnitude of the incentives was varied, which allows for investigation into whether the size of the incentives made a difference, while in others comparisons were made between incentives awarded to students, parents, schools, or teachers, or a combination of these. For example, a large quasi-experiment, with standardised outcome measures, has suggested that providing extra resources for schools led to greater gains than incentives for teachers (Lavy, 2002). Some studies compared delayed or immediate rewards. In some countries rewards were in the form of money paid into the child's bank account, while in others they were paid to the mothers or the families. In some cases, these awards were in the form of vouchers which the child could exchange for items in a shop. Some studies looked at the impact of financial awards for efforts into inputs (e.g., homework completion, number of books read), and in others, students were rewarded for outputs (e.g., performance on tests/exams and grade completion or enrolment in post-secondary education). These studies suggest that it is not just the use of financial incentives per se nor the size of them, but how and to whom they are distributed also matter. Therefore, it is important to also assess how such cash transfers are best implemented.

Some researchers have compared the impact of conditional and unconditional incentives to test the impact of cash transfers conditioned on input and output. These experiments test whether financial incentives helped motivate students to do better if lack of motivation or lack of information on the benefits of schooling was the reason for their low performance. If students' low performance was due to the lack of structural resources or knowledge then financial incentives would have no impact. And if financial incentives

undermine intrinsic motivation then giving students money could actually lead to negative outcomes.

Cash incentives can also be seen as an investment in human capital, targeted at groups that would otherwise not be in school, who would drop out of school early or fail to progress in education. The assumption is that offering financial incentives to students or families should increase students' effort to study and thus improve their performance at school (Gibbons, 1997; Lazear, 2000 Smith & Walker, 1993;). Money appears to be more of an incentive in poorer countries than in developed countries, such as the US (Hanushek et al., 2019). Behavioural psychologists might claim that if a financial reward is given for the performance of an unpleasant activity, such as studying, or completing homework, it will reduce aversion to that activity, thus leading to a long-term positive effect. Cognitive psychologists, however, might argue that financial rewards reduce intrinsic motivation (performing the task for its own sake), and any positive effects will be short-lived when that reward is removed (Deci et al., 1999; Kohn, 1999; Kruglanski, Friedman, & Zeevi, 1971; Lepper & Greene, 1973). Other social scientists might argue that there are other motivating factors besides money and effort, such as the understanding of the consequences or returns from small compensations (Bénabou & Tirole, 2003; Frey & Oberholzer-Gee, 1997; Titmuss, 1970).

Other studies have also shown that extra schooling tends to improve attainment (Gorard et al., 2023). Regression discontinuity analysis of PISA data shows that an extra year of schooling increases math scores by 30% in Brazil (Marchionni & Vazquez, 2018). An RCT in China found that additional school funding tied to peer tutoring was also promising (Tao et al., 2010).

Methods used in our structured review of evidence

This review is part of a larger study looking at the impact of school enrolment, attendance and participation on the educational outcomes of children living in poverty, and/or in low- and middle income countries. For this reason, much of the focus of the review was on less developed school systems. This paper is specifically about attainment outcomes. It addresses the research question about the impact of "finance-based" interventions in improving students' attainment at school. These interventions include the use of additional funding to create more school places, and to make existing places free, to provide external motivation to do well at school. A number of other approaches were also found and are reported for completeness, but they are not the focus of the study. There are also numerous interventions to improve the learning outcomes of children in low- and middle-income countries. For example, the review of Evans and Popova (2016) indicated that pedagogical interventions and repeated teacher training are promising, and many more. But, for the purpose of this paper, we focus on how money can be effectively used to improve children's education. The search strategy began with the identification of the databases.

Databases

The following educational, psychological and sociological electronic databases were used for the search:

- JSTOR
- Social Sciences and Education Full Text
- Web of Science
- Science Direct
- Proquest Dissertations and Theses (http://library.dur.ac.uk/record=b2044198~S1)
- EBSCOhost (which covers the following databases: ERIC, PsychINFO, BEI, PsycARTICLES and IBSS)
- Australian Education Index
- Cochrane controlled trials register
- Campbell library
- Global health
- Medline
- Sociological Abstracts
- plus Google and Google Scholar.

Further studies were added using citations from our previous work and from references in prior systematic reviews uncovered in our searches. Authors known for their research with the World Bank on improving education outcomes in developing countries were contacted to identify studies that we may have missed in our search. All searches were limited to studies published in the English language. To keep the search open no date limits were set. To help avoid publication bias, the search included any material whether published or unpublished.

Search strategy

The keywords developed to facilitate the search included:

Developing/low or middle income nations

A list of countries specified from Afghanistan* to Zimbabwe* OR "developing nation" OR "developing region" OR "developing countr*" OR "third world nation" OR "third world country" OR "third world region" OR "low income nation" OR "low income country" OR "low income region" OR "impoverished country" OR "impoverished region" OR "impoverished region" OR LMIC.

AND.

Evaluation

evaluat* OR random* OR controlled OR "control group" OR comparison* OR propensity OR discontinuity OR match* OR lotter* OR "study design" OR rigorous

OR trial OR experiment* OR intervention* OR "randomi* control trial" OR "RCT" or "regression discontinuity" or "causal evidence" OR "quasi-experimen" OR "difference-in-difference" or "instrumental variable*" or strategy* OR "approaches"

AND.

Intervention

impact* OR effect* OR effectiveness.

AND.

Enrolment outcomes

attainment OR achievement OR school outcome OR test OR exam* OR score.

AND.

Children

youth* OR child* OR student* OR adolescent* OR teen* OR boy* OR girl* OR pupil* OR youngster* OR juveniles OR minors OR kids OR "primary" OR elementary OR "middle school" OR "junio* school" OR "mobile child*" OR migrant*

These search terms were tested for sensitivity to ensure that they picked up relevant pieces of literature and studies already known to us. The syntax had to be modified (but used similar key words) to account for the idiosyncracies of different databases.

Screening

Identified studies were first screened for duplicates and relevance, on the basis of their title and abstract. Only studies that appeared to be related specifically to the research questions were retained.

Studies were included if they:

- addressed the issue of academic attainment
- included students of school-age, or school-related outcomes
- were empirical research with a comparative, or experimental design
- had measurable outcomes (e.g., attainment scores)
- were related to mainstream education (i.e., not solely about special, alternative education or supplementary schools).

Studies were excluded if they were:

- not primary research
- solely opinion pieces, description of programmes or intereventions, guidance briefs, anecdotal accounts from schools or policy makers about successful strategies

- not about any interventions/programmes that address school attendance, enrolment or attainment
- not evaluation of children's educational outcomes
- specifically about health or behavioural outcomes
- only about parental/family outcomes

Any studies thought not to meet the inclusion criteria were reviewed by another member of the research team for consensus. Studies that were deemed relevant to the research questions and met our inclusion/exclusion criteria were retained for data extraction. These studies are described in the results section (below).

Data extraction and quality assessment

The full texts of included studies were then read and key information relating to research design, scale of study, how groups were assigned (for RCTs), the outcomes measured, how they were measured and any threats to validity (e.g., missing data, diffusion, conflict of interest) were noted. Such information is essential in determining the strength of the evidence. This is to ensure that the findings are based on the most robust evidence. Each piece was then assigned a security rating from 1 🔒 (the minium standard required for causal studies) to 4 🔒, the most secure in any real-life causal study using the "sieve" (Table 1), a quality assessment tool (Gorard, 2021). Studies that were rated 0 were excluded. These are studies that are judged so weak that they contribute nothing to the evidence for causal claims.

To establish inter-rater reliability, all members of the team independently reviewed 10 randomly selected reports and their ratings compared. Where they differed, these were discussed to help establish common use of the criteria.

Reading the "sieve" starts with the study research design. As this study is based on a causal question, an appropriate design is sought (e.g., randomised control trial or equivalent), and such studies will be rated 4 🔒 initially. Weaker designs for causal claims have lower ratings. Large quasi-experimental studies (where groups are not randomly allocated, but naturally created) will start at 3 🔒. The next column concerns the scale of the study. If it is a large sample (in each group for comparison), then it remains at 4 🔒 (or whatever), but if the sample is small, it moves down to 3 🔒 and so on. The third factor is attrition. If there is large attrition resulting in imbalance between groups, then the study may drop further in the ratings. The "sieve" is therefore read from left to right, and from top to bottom. Ratings only go down and not up. Where key information such as the amount of attrition is not reported, the piece is downgraded accordingly. The "sieve" is only concerned with the strength of the evidence, i.e., the trustworthiness of the findings. Whether the intervention was deemed successful or not, or whether the report author claimed the intervention was

Table 1. Quality assessment "sieve" for causal studies.

Design	Scale	Dropout	Outcomes	Other threats	Rating
Fair design for comparison (e.g. RCT)	Large number of cases per comparison group	Minimal attrition with no evidence that it affects the outcomes	Standardised pre-specified independent outcome	No evidence of diffusion or other threat	4
Balanced comparison (e.g. Regression Discontinuity, Difference-in Difference)	Medium number of cases per comparison group	Some initial imbalance or attrition	Pre-specified outcome, not standardised or not independent	Indication of diffusion or other threat, unintended variation in delivery	3
Matched comparison (e.g. propensity score matching)	Small number of cases per comparison group	Initial imbalance or moderate attrition	Not pre-specified, but valid outcome	Evidence of experimenter effect, diffusion or variation in delivery	2
Comparison with poor or no equivalence (e.g. comparing volunteers with non-volunteers)	Very small number of cases per comparison group	Substantial imbalance or high attrition	Outcomes with issues of validity and appropriateness	Strong indication of diffusion or poorly specified approach	1
No report of comparator	A trivial scale of study (or N unclear)	Attrition not reported or too high for comparison	Too many outcomes, weak measures or poor reliability	No consideration of threats to validity	0

effective, does not influence the rating. Therefore, interventions/programmes with the most number of studies reporting positive results do not necessarily mean they are the most effective. It is those interventions with the most highly rated studies reporting positive results that would be the most promising.

Synthesis of included studies

We will almost certainly have missed some relevant studies and have misclassified others. However, the patterns we found were clear enough to be able to claim that they would not be substantially disturbed by the addition of a further studies, Our concern is with what the overall body of evidence found in this review shows. As discussed further later in the paper, the use of quality judgments about each study means that this review may report different studies (only those graded greater than zero) to previous ones.

The studies are classified according to how financial incentives are used, such as, providing new school places, offering free education, using cash transfers as an incentive for attainment ~~or improving the health or nutrition of students~~.

While we report the size of the effects for studies where these are available, we do not aggregate or average the effect sizes as this gives a misleading impression about the efficacy of any programme since studies with weak designs, such as single group pre- post-studies, studies with very small samples or non-randomised samples tend to report very large effect sizes (Slavin and Smith 2009). Instead, we classified the studies by how financial incentives might be used and the method by which such incentives are administered, the direction of the effect (positive, unclear, or no change/negative) and the strength of the evidence.

Results

The search identified a total of 749 potentially relevant studies (Figure 1). Where studies were reported in different outlets, such as working papers, project reports or journal articles, we retained the most complete version. We excluded studies that are specially about children's health or behavioural outcomes or outcomes relating to parents and families. Almost all the studies involved the use of financial policies. A total of 55 studies covered attendance and enrolment as outcomes. This paper considered only 46 pieces reporting 47 studies, that were rated at least 1 🔒, and had attainment outcomes. Banerjee et al. (2007) reported 2 experiments in the same paper, hence considered as two studies.

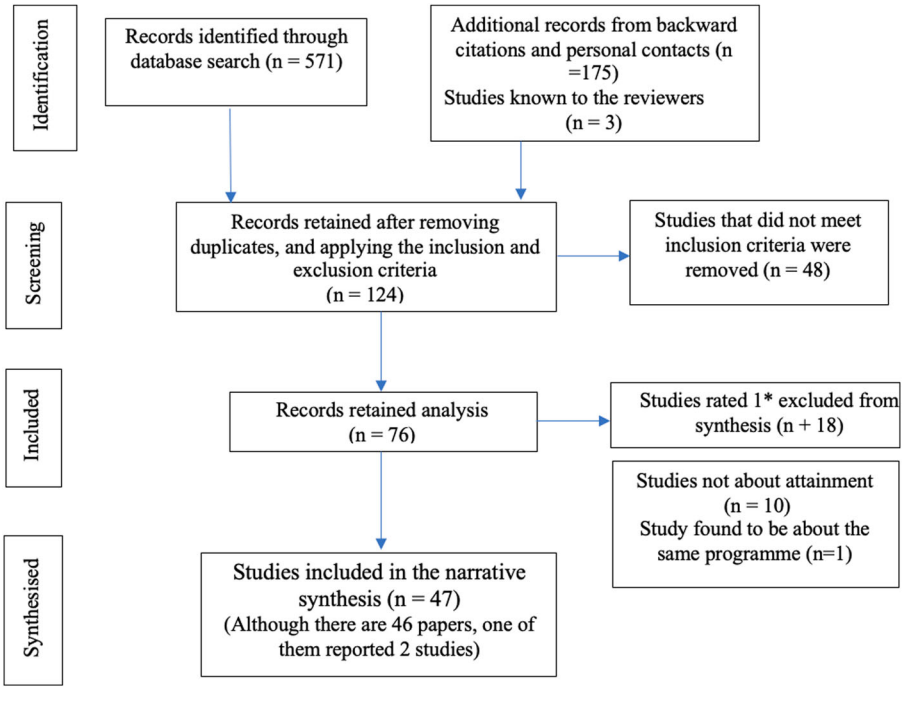

Figure 1. Prisma flowchart showing records of studies at each stage of the review.

Table 2. Strength of evidence and impact for studies linking financial incentives to attainment.

Strength of evidence	Positive	Unclear/mixed	Negative/neutral
4 🔒	1	–	–
3 🔒	8	1	4
2 🔒	17	3	3
1 🔒	6	3	–

Table 2 summarises the evidence ratings of the 47 studies and their impact. We ignored those rated zero for trustworthiness, as they do not add to the evidence. The majority of the studies reported positive results, including some of the strongest studies. Financial incentives appear to work for improving attainment, at least in developing countries. However, it is not about simply giving people more money, but what the money is used for, how it is administered and for whom, that matters. We summarise first how financial incentives are used, then we consider how the cash incentives could be most effectively administered. Finally, we briefly examine how funding to improve health and nutrition and providng resources and information can improve attainment.

The stronger studies suggest that using financial incentives to provide new school places, reducing or eliminating the cost of schooling, and offering conditional cash transfers are promising ways to improve educational attainment. But the number of highest rated studies (i.e., 4 🔒) is so few that the evidence can only be suggestive. There are four 3 🔒 showing negative or neutral results and 9 positive studies rated at least 3 🔒. Therefore, on balance we can say that financial incentives seem to work in raising attainment.

Providing new school places

One way of investing in education is to provide new school places. Although we know that this can improve school attendance for students from poorer families (Gorard et al., 2023), this review found no high quality studies to say whether this approach is also effective in raising attainment. The best studies found have been rated at 2 🔒.

2 🔒 Studies

Duflo et al. (2009) looked at the impact of smaller classes in grade 1 in Kenya. Out of 140 schools, 70 were randomly selected for extra funding to hire an extra teacher and open a second classroom. Children were randomised to classes. In independent assessments of language and maths, treatment classes scored higher (effect size = 0.16). However, there was a 23% attrition of student scores after one year.

In remote areas of Pakistan, there is no universal access to government schools. The Sindh Education Sector Reform Programme is a public-private programme, which encouraged entrepreneurs to establish and operate free, co-

educational primary schools in villages in remote areas by giving them a per student cash subsidy. The programme was intended to improve the enrolment and learning of primary school students, by making schools available (Barrera-Osorio et al., 2017; World Bank 2018). The Sindh Education Foundation together with a World Bank team also provided free textbooks, teacher training, and regular visits from foundation staff to advise on how to improve teaching and learning. Schools had to meet minimum facility standards, exempt tuition fees for all students, and hire teachers with at least eight years of schooling themselves. Villages with poor school access were randomised to the treatment group where they received a subsidy of 350 rupees per student regardless of gender (82 villages), or an additional 100 rupees for each female student (79 villages), or no subsidy (38 villages). Children in treatment schools did better on attainment tests, especially those who enrolled due to the programme. The additional subsidy for girls had no impact on enrolment or test scores. This study was not well reported, and it is unclear whether the testing was independent of the developer.

In Afganistan, 13 villages were randomly assigned to receive community-based schooling a year before it was provided for the entire sample of 31 villages (Burde & Linden, 2009). Outcomes were attendance and scores in maths and the local language. The presence of a community-based school increased enrolment, and test scores went up by half a standard deviation, with the results better for girls.

Offering pre-school places is another use of financial resources to improve academic outcomes of pooer children. Chen et al. (2022) looked at the One-Village-One-Preschool initiative that guarantees early childhood education to all children in high-poverty villages in China. Following 23,775 children from preschool to fourth-grade in a high poverty area, the study found that children with two years of pre-school entered first grade with similar attainment to children from a more prosperous urban area (having been behind at the outset). However, those who had only one year of pre-school actually fell slightly further behind. That extra year seemed to matter.

1 Studies

A weaker study compared the academic performance of children who had pre-school experience and those who had not in Botswana. Taiwo and Tyolo (2002) selected 60 grade 1 students across 12 diverse primary school classes who had pre-school experience and 60 who had not. At the start of schooling, children were assessed on five English-related, five mathematics-related, and five science-related items. Those with pre-school outperformed the others in all areas (effect size = 2.01). Since the groups were naturally allocated, they cannot be assumed to have been balanced at the outset.

Another study compared children attending pre-school in some villages in Bangladesh to those not in pre-school in neighbouring villages, in a cross-

sectional design (Aboud, 2006). Cognitive, school readiness and social play scores of pre-school children were higher than those of the comparison children with large "effect" sizes (up to 1.0 for school readiness). However, the groups were clearly not comparable at the outset.

Making school places free

Making schools free and more accessible by reducing or eliminating schools fees, where applicable is more promising than just providing school places. One way to make schools free is by offering scholarships to students or grants to schools.

4 Studies

Duflo et al. (2021) estimated the effects of free secondary education in Ghana using randomised assignment to secondary school scholarships. The students were followed for 12 years until the age of 29, with relatively low attrition (6%). Scholarship students scored higher on maths and reading comprehension, five years after the study (effect size 0.16).

2 Studies

Another study also evaluated a scholarship programme (Kremer et al. (2009)). This study was conducted in Kenya where girls in grades 5 and 6 who scored well in academic exams received a scholarship for the next two years. This covered fees, school supplies, and public recognition in a big school assembly. A total of 11,728 students competed for the scholarships in 64 schools. 12 schools withdrew but their scores were included in an intention-to treat-analysis. Only 65% of baseline students provided subsequent test scores. The results were mixed. In one district girls in the treatment group were ahead (effect size 0.12). In the other district attrition was too high to decide on impact.

In some countries cash grants were offered to schools. Das et al. (2013) conducted a natural experiment in Zambia where schools became free in 2001, and a fixed cash grant of $600 per school was introduced, meaning it was the same amount for large and small (rural) schools. Small schools therefore received more funding per pupil. However, 24% of schools still received (unanticipated) discretionary funding in 2002. Based on 172 schools, the study showed a positive correlation between discretionary/unanticipated funding and test scores for English and maths (effect size 0.1).

1 Studies

Angrist et al. (2002) looked at Programa de Ampliacion de Cobertura de la Educacion Secundaria in Colombia. The programme offered school vouchers to more than 125,000 children from low-income families, covering more than half the cost of their private secondary school. Vouchers were awarded by

lottery and students could receive more vouchers as long as they maintained good academic performance. Out of the 473 invited for testing in literacy and maths, 283 children were tested resulting in a response rate of about 60%. Lottery winners scored higher than losers (effect size 0.2). Scores were not clearly reported. A follow-up study suggested that there was a long-term impact on learning outcomes and high school graduation, especially for females. However, the evidence is weak as only 35% of the original voucher recipients could be matched successfully.

Summary

Providing free places is more promising in improving average attainment than simply creating new school places. The strongest single study suggests that making schooling free is not only beneficial for wider enrolment and attendance, but also improves attainment. Overall, the evidence suggests that there is a positive effect on children's educational outcomes (Table 3).

Cash incentives or grants

Another intervention that has been tried in both developed and developing countries is the use of cash transfers. There are no 4 🔒 studies on this, but a reasonable number of 3 🔒 studies.

3 🔒 Studies

The evidence from the 3 🔒 studies suggests that the use of cash incentives has promising effects on academic attainment in low- and middle-income countries. Stampini et al. (2018) used a regression discontinuity design to examine the effect of the Programme of Advancement through Health and Education on the Grade 6 achievement test for urban children aged 11–12 in Jamaica. Receipt of the cash was conditional on at least 85% attendance by the student. The amount varied with gender and grades, with boys receiving more. Data from 341 secondary schools, including a sample of 15,509 urban children for which data could be merged, was used for the analysis. Eligibility was means tested. Outcomes of children above the eligibility cut-off (intent-to-treat group) were compared with those below the cut-off (control). The results showed an improvement in the attainment of boys, but there was no effect for girls. The authors proposed that this was because girls had higher pre-treatment GSAT scores, so there was less room for improvement.

Table 3. Strength of evidence and impact for studies linking free school places to attainment.

Strength of evidence	Positive	Unclear/mixed	Negative/neutral
4 🔒	1	–	–
3 🔒	–	–	–
2 🔒	5	1	–
1 🔒	4	0	–

Another conditional cash transfer programme in Malawi also shows positive effects on children's cognitive outcomes (Baird et al., 2011). The incentives were targeted at adolescent girls. The programme was evaluated in a three-armed cluster randomised control trial where enumeration areas were randomly assigned to conditional (based on at least 80% attendance) or unconditional payments or a control. The final sample was 2,284 girls in 161 treatment areas, who were at school at the outset. The conditional group scored higher in English, maths and cognitive ability. And this gain was retained to some extent after five years (Baird et al., 2019). However, conditional cash transfer may have a negative impact on non-schooling outcomes, such as teenage pregnancy and marriage rates, likely due to girls dropping out of school as suggested by the authors.

One study in Senegal where schools used a cash grant to improve learning outcomes of children in grades 2 and 4 showed that children in the schools that received the grant did better on maths, French and oral reading for the younger grades with girls showing a bigger overall effect size (0.25) than boys (0.08), compared to schools that did not have the grant (Carneiro et al., 2015). This persisted for at least two years, but there was no long term effect, presumably because of the wait-list design. Attrition was 17%. In this study, schools were invited to apply for the grant and the 633 high quality proposals were randomly assigned to receive funding in three separate years (211 in each). This allowed the first cohort to be the experimental group and the other two cohorts formed a natural control in a waiting list design A random sample of children in grades 2 and 4 were then selected.

A two-year teacher-reward programme in Kenya, where teachers received up to 43% of a teacher's typical monthly salary based on the performance of their students, saw improvements in students test scores, mainly in year 2 (Glewwe et al., 2003). The children were in grades 4–9. 50 schools were randomly selected from 100 low attaining schools to be offered the teacher-reward programme. Students in both groups had similar grades at the outset, but those in the treatment schools were more likely to take later examinations, less likely to drop out, and had some improvements in scores. Students who did not take the exams were given low grades so that weak students were not discouraged from taking the exam. However, there was no sustained effect as the gains were not maintained.

Fernald et al. (2008) analysed the cumulative impact of a conditional cash transfer programme for low income households in Mexico, known as Oportunidades (formerly PROGRESA) - a conditional cash incentive for families in exchange for regular school attendance, health clinic visits and nutrition support. This was a wait-list cluster RCT where 6,695 households with children aged 24–68 months were randomly selected to receive the treatment first and another 4,029 households to receive it later. Randomisation was done at community level. Children in households that received the cash transfers showed

better health and cognitive development than children in the control group, and the amount and duration of payments also matter. A doubling of the cash transfer was associated with improvement in long-term and short-term memory, visual integration and language development.

Despite the success of cash incentives in developing countries, they do not seem to be effective for children in developed countries. Fryer (2011) evaluated the impact of financial incentives on student achievement from four different field experiments in 200 low-performing urban schools across three US cities. Money was paid to students to help motivate them to do better, and see if lack of motivation or lack of information on the benefits of schooling was the reason for their low performance. Within each city, schools were randomly assigned to treatment or not. In New York City, payments were given to fourth- and seventh-grade students conditional on their performance on 10 standardized tests. In Chicago, incentives were paid to ninth graders every five weeks for grades in five courses. The Dallas program gave second graders $2 per book read, with an additional requirement of passing a short quiz on the book. In Dallas, the treatment was combined with Accelerated Reader (a program to encourage reading). The cash incentives condition on academic performance showed no impact on maths and reading in any city. In a fourth city, Washington, incentives were given to sixth, seventh, and eighth grade students based on a composite index intended to capture their school attendance, behaviour, and measures of inputs in educational production. The results suggested positive impacts on behaviour. These findings indicate that cash incentives are more effective in improving inputs for attainment (such as behaviour and attendance) than attainment itself, as students do not necessarily know what behaviours lead to improved test performance.

In England, cash incentives for performance also do not seem to work. Burgess et al. (2021) conducted a randomised control trial involving 10,000 students, and found little or no impact of incentives for KS4 students (age 15–16). In fact, there was a negative overall outcome for maths and science, and a slightly positive one for English.

2 Studies

A lower rated study conducted in the US, also found that scholarships in the form of cash given to students seemed to make no difference to students academic performance (Barrow & Rouse, 2013). The study evaluated two performance based scholarship programmes - one for students in their last year of high school (California) and one for post-secondary students (New York City). The post-secondary students were recruited at campus and randomly assigned to receive a performance-based scholarship up to $1,300, or not. The incentive was intended to reward attendance and performance at the end of the semester, and the amount varied with achievement. In California, high school students from low income families who attended a “Cash for College” workshop

were randomly assigned to either a performance-based scholarship (2,474 cases) paid directly to them, or the money went to their institution (4,188). The scholarships led to more time spent on educational activity, but this did not continue once the brief scholarships were completed. The amount of money made no difference. It is possible that there is a limit to how much students can change, or that the increased money reduced intrinsic motivation. The situation was confused by students having other state grants available.

Bettinger (2012) evaluated a pay-for-performance programme for primary students in grades 3–6 in Ohio. Children received payments for successful completion of standardised tests – in maths, reading, writing, science, and social studies. Eligible students received $15 vouchers for each test in which they scored "proficient", and $20 for a higher score. Grades were randomised to treatment or not in each school. The study reported improvement in maths (effect size 0.13), but the incentive was not effective in moving students from non-proficient to proficient, only in moving some students from proficient to higher levels. There were no effects for other subjects. There is no clear pre–post comparison of treatment and control groups.

Consistent with the 3 🔒 studies, the 2 🔒 ones also showed that cash incentives can raise attainment in less developed countries. Barrera-Osorio et al. (2021) looked at teachers receiving in-kind incentives for the academic improvement of disadvantaged children in Guinea, compared to recognition of services, and business as usual. Based on 420 schools, the treatment led to improvement in the first year but the effect diminishes in the second year.

A scholarship scheme in India which offered scholarships to children aged 3.5–4.5 to encourage attendance in a private kindergarten showed positive effct on children's cognitive skills (effect size = + 0,8), but no effect on primary school enrolment or social emotional development (Dean & Jayachandran, 2019). Scholarships were randomly allocated to half of 808 eligible children (not attending pre-school) in 71 villages, if parents agreed to enrol their children in the private kindergarten. It was rated 2 🔒 because of missing data from 22 children at the end.

A two-year randomised trial in rural Burkino-Faso assessed the impact of different cash transfer delivery mechanisms (a conditional cash transfer given to fathers or mothers, or unconditional cash transfer given to fathers or mother). It found that conditional cash transfer had a positive impact on school enrolment, particularly for girls, younger children, and lower ability groups (Akresh et al., 2013), which are traditionally less likely to enrol in school. Children who would otherwise not have enrolled in school performed just as well as their peers on average in maths and French tests. The condition was that children aged 7–15 enrol in school and attend classes regularly (90%). The study used difference-in-difference models to control for variation across villages. Stipends were paid quarterly, and the amount varied with the age of the child, with older children receiving more. The study provides

evidence that the conditional cash transfer mechanism can be an effective tool to improve school enrollment, particularly for traditionally disadvantaged groups.

Filmer and Schady (2009) analysed the effects of the CESSP Scholarship Program in Cambodia, which gave scholarships to poor children for the three years of lower secondary school. The scholarships were cash transfers to families of children selected for the scholarship, conditional on school enrolment, regular attendance and satisfactory grade progress. Pupils with the highest dropout risk in 100 high poverty schools were selected. Two-thirds of the scholarship recipients were girls because they were deemed more likely to drop out of school than boys. Regression discontinuity was used to compare students who were offered scholarships with those who just missed out. Unlike Akresh et al's study, this study found that the intervention improved enrolment but did not improve children's maths and vocabulary test scores 18 months later. The study was given a lower rating because reporting was unclear.

In Argentina, a conditional cash transfer programme, known as the Programa Nacional de Becas Estudiantiles, targeted students between the ages of 13 and 19 years, at risk of dropping out. Using a retrospective cohort design, Heinrich (2007) compared scholarship recipients with those who were eligible but did not receive scholarship due to a quota. Scholarship recipients appeared to perform better than non-recipients, and greater impact was seen among those in the programme for more than one year. The programme also increased students' attendance, and reduced grade repetition. Attrition was high, and the two groups were not randomly assigned, hence it was rated 2 🔒.

In some countries cash incentives are used for school improvement. Skoufias and Shapiro (2006) examined the Quality Schools Programme, a school improvement programme in Mexico, where schools were offered a five-year grant to carry-out improvement plans with parents involved, and training offered to principals. The programme was aimed at expanding autonomy and improving learning in disadvantaged urban schools. The authors constructed a panel of schools and used difference-in-difference regression analysis and propensity score matching to create a control group. There were 9,244 schools in the treatment group and 65,457 in the control. The programme was found to reduce the student failure rate by 0.24 percentage points, grade repetition by 0.31 and the dropout rate by 0.21 in comparison to the control group.

1 🔒 Studies

The lower ranking studies, in terms of strength of evidence, suggest quite mixed results. Two reported no benefit and even negative effects. Behrman et al. (2000), for example, found that the PROGRESA programme in Mexico had no effect on students' test scores. There was no benefit for the treatment group

in terms of student test scores. However, the two groups were not balanced, and essential data was missing.

List et al. (2018) suggested that cash incentives for school performance might actually have a negative effect by damaging intrinsic motivation. Using nine low attaining US elementary and middle schools, tutor groups were allocated, in a strange manner, to control, or a treatment of incentive payments to student, parent and/or teacher. On a low-stakes test the incentives produced better results, but on a high-stakes test there was a small negative impact. The cases were not properly randomised.

Andrew et al. (2018) looked at a non-conditional cash transfer programme in Colombia where 96 towns were randomly allocated to control, psychosocial stimulation, nutrient supplementation, or a combined intervention. 1,419 children aged 12–24 months from households that benefitted from a cash transfer programme formed part of a cluster randomised trial that lasted 18 months. Attrition was 11%. The stimulation intervention showed a short-term impact on cognition (0.26) and language development (0.22). None of the other interventions had any effect. In fact, there was a small negative effect of combining the supplements and stimulation treatments (e.g., language −0.13). This cast some doubts on the other results. It is difficult to tell from this study whether the cash transfer alone had any impact.

In a study by Riccio et al. (2010), low-income families were offered cash rewards to encourage parents to engage in activities related to children's education (among a range of other things such as health and employment). There were more than 50 outcome measures, making the claims for the success in any one outcome very weak. There appeared to be a small benefit for maths scores for one year, and some improvements in attendance.

Fullard (2019) reported that a 10% increase in teacher salary is equivalent to a one pupil reduction in class size or a one hour increase in weekly instructional time. The effect size was small.

Summary

The body of evidence linking cash transfers to improved attainment is mostly positive but quite mixed (Table 4). It would appear that cash incentives for performance are more effective in developing countries in raising attainment. They do not seem to have any impact on attainment in more developed countries like the US and England. Conditional cash incentives also, and understandably, seem to work for those with the potential to achieve, but not for those who have not reached that potential.

Several studies of varying quality found no clear benefit, or worse. It is easier to pay people to attend school than to do well at school as a consequence. It is also easier to pay students for other inputs like behaviour or completing homework than to reward them for outcomes. Students know what it means to attend, but they may not understand what they have to do to improve

Table 4. Strength of evidence and impact for studies linking cash transfers to attainment.

Strength of evidence	Positive	Unclear/mixed	Negative/neutral
4 🔒	–	–	–
3 🔒	4	1	2
2 🔒	5	1	2
1 🔒	2	2	–

attainment. Money by itself may therefore not be enough, especially for the weakest students. The impact also seems to be stronger with low-stakes tests. The cash is usually given to families or older students and this is where the strongest evidence lies. The impact seems to be sensitive to the length and amount of payment, and there is evidence that once the payments cease there is no long-term impact on attainment at all. This leads to the next research question. How are cash transfers best organised?

How should cash transfers be paid?

There are many variations on how cash transfers are paid, when and to whom. Are incentives best given to parents or directly to students, schools or teachers?

3 🔒 Studies

Berry (2015) used eight government primary schools (grades 1–3) in India and randomly assigned them to receive either toys as an incentive (or toy voucher) or cash equivalent given to either the parent or the child. Children were pre-tested, given a reading competency goal, and retested after two months. If the child attended free after-school classes and achieved the goal the incentive was paid. Paying parents is more effective in improving both attendance and attainment for children with high initial test scores, but for children with low initial test scores, it is more effective if the incentive is given directly to the child. Perhaps for those with low test scores, giving them the incentive directly increases their motivation to do well by improving attendance.

The Aligning Learning Incentives programme in Mexico offered monetary incentives on condition of student performance in maths in grades 10–12 (Behrman et al., 2015). This was a cluster randomised trial in which 88 Mexican high schools with over 40,000 students were randomised to three treatment groups and a control. In one group students were paid for their maths performance, in another teachers were paid for student performance, and in the third students, teachers and other school staff were paid for their performance and that of their peers. The results are reasonably clear. Students in schools where teachers were paid performed no better than those in control schools. But where students were paid directly, they scored better than the control. The strongest effect was seen in schools where the school, teachers and pupils were paid if the students performed well. This suggests that a

collaborative effort where the whole school benefits is more powerful than if the incentive benefits only the individual. These differences lasted for at least three years. There was some diffusion of the treatment because some schools also received a separate attendance subsidy.

In another study, Mbiti et al. (2019) tested the impact of three different ways of administering incentives with 350 schools in Tanzania using an RCT where schools were randomised to either unconditional incentive grants, teacher incentives based on student performance or both of these. The school grants had no impact on test scores. The teacher incentives led to a small increase. The best results came from providing both kinds of payment. It is possible that adding teacher incentives to standard school grants could increase the cost-effectiveness of education.

A similar study conducted in India looked at whether giving teachers incentive (equivalent to 3% of teachers' annual salary) for their own student performance or for the average school performance is better in raising student performance (Muralidharan & Sundararaman, 2006). In this study, 500 schools were randomly selected to receive either of the incentives.. A further 100 schools acted as a comparison (but were not randomly allocated). Student attrition was 14.2%. The results showed that students in treatment schools performed better than the control in maths (ES = 0.19) and language (ES = 0.12). as well as science for which there was no incentive. This might be a spillover effect, or the schools might not have been comparable anyway. Students in individual incentive schools did very slightly better than students in group incentive schools.

Das et al. (2013) evaluated another school block grant in India, which ran for two years across 200 state primary schools. Schools were selected by lottery to receive a small grant (around $2 per pupil) over and above what they would have received in their regular school allocation. The condition was that the funds had to be spent on items used directly by students, and not on infrastructure, for example. In the first year the grant was a surprise, but was anticipated by the second year. Students in the 100 treatment schools performed better than those in the 100 control schools in the first year (ES = 0.08 for language and 0.09 for maths). There was no difference in the second year, suggesting that when schools do not expect grant, they performed better when they are awarded it. It may be that if the grant is anticipated, the schools do not feel the need to put in more effort.

Another kind of school grant used in England is the Pupil Premium funding. In England, Gorard et al.'s study (2022) of the national Pupil Premium (PP) funding found that the funding reduced the attainment gap between disadvantaged pupils and their peers. The data was based on a national cohort of primary school pupils from 2006 to 2019. PP is a financial policy given to all state-funded schools proportionate to the disadvantaged pupils (mainly those eligibile for free school meals) in the school. The money was intended to be used by the

school to improve the attainment of poorer pupils. This suggests that cash incentives in developed countries can work if given to the school for programmes/interventions specifically to raise attainment.

2 Studies

Levitt et al. (2010) conducted a study in two low performing high schools in a Chicago suburb looking at whether incentives given to students or parents, and whether the incentive was a fixed rate or a lottery was more effective. These incentives were given monthly either directly to grade 9 students or their parents either as a fixed rate or a lottery for school attendance, behaviour, grades, and test scores. Students were randomised to four treatment groups and a control. The expected value was $50 per month. There were immediate gains in achievement, especially for those at the threshold of meeting basic standards at the outset. Perhaps incentives are more effective in improving the attainment of those who have the potential to achieve, but have not done so yet for some reason. There is no difference between incentives awarded to parents or students, or fixed or by lottery. However, after three years all gains disappeared.

List et al. (2018) used two experiments to assess the impact on students' high stakes test scores of providing cash incentives to students, parents, and/or tutors, in nine elementary and middle schools in Chicago. Tutor groups were allocated to six arms – the "randomisation" was repeated 500 times to achieve best balance between groups, so the groups are not actually random at all. Other than the control, incentives were given to students, parents, tutors, parents and students, or all three. This divides the total of 380 students into six groups, making each one quite small. In one experiment the rewards came after test success and in the other the rewards came later. The results were mixed. There were apparent improvements in the incentivised low-stakes test but not in the non-incentivised high stakes test.

A study in China compared the relative effects of cash incentive for primary school students for achieving grades with peer tutoring and parental communication (Li et al., 2010). This was a school-level RCT. In 12 schools, 47 classes received cash incentives, and 18 did not. In 11 schools, 44 classes were given peer-tutoring, and 18 not. The cash incentive and parental communication alone had no effect on attainment, but when combined with peer tutoring, students appeared to do better than control. This suggests that peer tutoring was a key factor. The study is poorly reported and confusing.

Another study, also conducted in China used a regression discontinuity design to study a poverty alleviation programme in rural China and its impact on the school attainment of 13 year olds Nong et al. (2021). The programme included farming subsidies, business subsidies, housing improvements, and education and health benefits. The two groups at the cut-off score on initial need were fairly similar. There was no impact on boys' scores, but an improvement for girls.

Summary

In summary, the evidence here is slightly confusing. There are indications that combining cash transfers with other measures, such as tutoring, might be more effective than cash alone. There is a primacy effect, with new cash transfers being more effective than established, taken for granted, ones. When cash grants are expected, there is less effort to perform. For young children, it makes more sense to give the cash to their parents, but as they get a bit older this appears to make less difference and when the child is a young adult it is perhaps preferable to pay them directly. Payments to families/students are somewhat more promising than incentive payments to teachers, which in turn may be more promising than payments to schools. It also seems that incentives that benefit everyone in the school can be more powerful than incentives that benefit only the individual. The use of conditions attached to the funding is important.

Health and nutrition

The review also looked at how the use of funds to improve the health and nutrition can impact on children's attainment. No 4 🔒 studies were found for health and nutrition.

3 🔒 Studies

In many developing countries poor health and nutrition can have an important effect on children's learning. Simeon et al. (1995) recruited 407 mainstream primary school pupils in Jamaica who had high levels of T.trichiura infection, and 206 were randomly assigned to receive treatment of 800 mg of albendazole, and the others received a placebo. Fifteen children were not included in the post-test analyses because they changed schools during the academic year. Post-test measurements were taken about 26 weeks after the first round of treatment. The medical treatment was effective but the impact on school attainment was marginal or non-existent (effect sizes of 0.04 for arithmetic, and 0.02 for both spelling and reading). This suggests that reducing infection alone is not enough if we are concerned with children's learning outcomes.

In a cluster randomised trial, McKay et al. (1978) examined the impact of health, nutrition and education activities for pre-school children in Colombia. Five groups with varying levels of treatment were created using 333 children with signs of poor nutrition. Short cognitive tests were administered at five measurement points, and 53 children were lost due to emigration factors and death. Children with the treatment had higher cognitive test scores, especially when they started the programme younger, suggesting that early intervention is important. The effect was still maintained a year after the programme ended.

To improve nutrition for some poor children, some countries have introduced a breakfast programme. In rural Jamaica, 814 children in grades 2–5 in 16 schools were randomised either to receive a free breakfast every day for a

year, or else a quarter of an orange (Powell et al., 1998). Both groups made little progress in reading, spelling and arithmetic, but the breakfast group made slightly more progress (as did those children judged as adequately nourished at the outset). Scores are missing for 45 children.

2 Studies

A study in England, which provided free before-school breakfast for children (Crawford et al., 2019) in Year 2 and Year 6 (age 6/7 and10/11) showed that the programme benefitted the younger children, but not the older ones. Year 2 children made an equivalent of two months' additional progress compared to children in the business-as-usual control schools. The study used a comparison group design (hence the lower security rating) involving around 8,600 pupils in schools with a high proportion of disadvantaged pupils. Schools were given a £300 grant upfront and provided with free food and support from a Magic Breakfast school change leader.

1 Studies

A low rating study examined the effects of an early childhood development and nutrition intervention on the cognitive performance of school-age children in rural communes in Vietnam (Watanabe et al., 2005). The programme included improving existing centre-based pre-schooling through material support and teacher training on child-centred teaching methods, training sessions for fathers and mothers separately on child care and development, a small local library for parents, and it promoted play corners in the homes of participating children. One commune with 172 students had been exposed only to the nutrition intervention, and another with 140 students had both. The attrition rate was 27%. The results suggest that combining nutrition with other development programes was more effective than either intervention alone.

Walker et al. (2005) evaluated the impact of a community aid programme, including food supplement and weekly home visits, on "growth-stunted" children in Jamaica. This cohort study consisted of three post-tests carried out when participants turned 7, 11 and 17 years old. 129 children were recruited from Kingston, Jamaica. There is data for 103 of these. Children receiving just the food supplement showed no improvement in IQ scores, maths, or language compared to a control. Again, as with the study in Vietnam (Watanabe et al., 2005), it is the combination of nutrition with other support that is needed to effect results. In this study, children with extra psychosocial stimulation showed improved scores (average ES = 0.5).

Summary

Providing school places, and getting students to attend schools, are the first steps in dealing with a poverty attainment gap. But being healthy enough to prosper at school is also important. Some of the evidence here is of reasonable

quality. In summary, health and nutrition interventions are found to have only a small impact on progress and attainment in poorer countries. These interventions need to be combined with other more direct learning support to have the most effect.

Other approaches – information and resources

We could have ended the review at this stage. However, our search also found a variety of other approaches, including using funding to give families information, or give schools specific resources. It is not clear that these must be excluded, but the list here can only be partial. The following studies are provided for the convenience and possible interest of readers.

Again none of these studies was rated 4 🔒.

3 🔒 Studies

Nguyen (2008) compared schools which provided parents information about children's educational performance (known as statistics schools) with schools where children had a role model and schools which had both role models and also provided information. The 604 schools in Madagascar were randomly assigned to one of the three conditions. The interventions consisted of parent-teacher meetings. A further 69 schools had no intervention. Final data was collected from grade 4 students (aged 9–15) after five months. Attrition was 12%. The statistics group had slightly better attendance, and better average test scores (ES = 0.2). The role model schools only showed improvement if the role model was a successful student from a previously poor background.

Loyalka et al. (2013) looked at the impact of career counselling, or providing information about school returns, on student dropout and achievement at school in rural China. 131 junior high schools and 12,786 students were randomised to one of the two treatments or a control. Students in the counseling group received four 45-minute lessons in career planning. Students in the information group were given one lesson about statistical graphs on wage differences with regards to educational attainment. A maths test was used pre and post. Neither intervention had an impact on maths, or on dropout or plans to go to high school. The interventions were of very short duration.

Dillon et al. (2017) compared the impact of a game-based pre-school curriculum in maths, for pre-schools in India. There were three arms for four months – 70 schools had maths games designed to improve children's skills in numbers and geometry, 70 schools used games focusing on social cognitive abilities without mathematical content, and 72 schools used a standard curriculum. The groups were similar at baseline. The age range of the 1,540 children was 2–12. The maths game group improved more than both other groups in geometric sensitivity and especially the non-symbolic maths test. The longer term impact was not so clear.

2 Studies

In some regions teacher absences are common due to the geographical nature of the area, which makes it difficult for teachers to reach schools. One study looked at whether offering teachers salary based on their attendance in schools as recorded by a camera with a tamperproof date and time (treatment group) or a fixed salary with threats of dismissal for absences would increase instruction time and children's learning. Duflo and Hanna (2005) conducted the trial where 120 education centres in India were randomised to one of two conditions. Teacher absence declined (halved compared to the baseline), and student instruction time increased in the treatment group, compared to the control. After a year, treatment students who had been illiterate at the outset scored higher in oral and written tests (ES = size 0.17), and were more likely to enrol in regular schools. Attrition was 11%.

In rural Kenya, the use of flip charts for schools where textbooks were sparse was found to improve test scores for children in grades 3–8 with an effect size of 0.2 (or perhaps less in an alternative computation). Two years later, there was no difference between the groups (Glewwe et al., 2004). The number of cases is unclear, and there is some attrition.

Banerjee et al. (2007) looked at remedial education, the Balsakhi Program, for students lagging behind in urban India. It required a young woman from the community to work on literacy and numeracy with grade 3 and grade 4 children who did not have these basic skills, out of regular classrooms for 2 h per day during normal school hours. In Vadodara, 98 out of 122 government primary schools participated. In year 1, half of them were given the treatment in grade 3 and the other half were given the treatment in grade 4. In year 2, the grades were reversed, and 24 more primary schools participated and were randomly assigned to the two groups. In Mumbai, 77 schools were stratified by test scores and language, which were randomly assigned to receive the treatment in grade 3 or grade 2. In the second year, the order of treatment was again reversed. The treatment improved average test scores by 0.14 standard deviations in the first year, 0.28 in the second year, and this dropped 0.1 once the programme was over. There was no impact on school attendance/drop-out. The tests and testing were not independent of the developer. Attrition was variable between groups.

The same researchers also evaluated a computer-assisted maths learning program for 5,945 grade 4 children in 67 schools (Banerjee et al., 2007). Children were offered 2 h of shared computer per week to solve maths problems by playing games. Schools were randomised in a waiting list design. The treatment had an impact on maths of 0.35 standard deviations in the first year and 0.47 in the second year. The effect dropped to 0.1 standard deviations one year after finishing the programme. There was no impact on school attendance/drop-out. The tests and testing were not independent of the developer. Attrition was 7%.

Evaluation of the BRIGHT Programme in Burkina Faso also shows positive impact on maths and French Levy et al. (2009).

Offering free educational materials and textbooks, does not appear to be effective in raising attainment for poor children. In 1995, the Ministry of Education of Kenya selected 100 (of the most "needy") primary schools in Kenya to participate in the School Assistance Program, and divided them into four groups. Group 1 received free textbooks in 1996. Group 2 received educational materials including textbooks in 1997, Group 3 in 1998, and Group 4 in 2000. In year 1, the 25 schools can be compared to the 75 schools that did not receive the treatment. In year 2, the 25 schools can be compared to the 50 schools that did not receive the treatment and so on. The impact was very small (ES = 0.02). Only students with high initial scores appeared to gain, perhaps because the textbooks were in English and they could read them better (Glewwe et al., 2009). A lot of students dropped out of school anyway.

Summary

In summary, there is some promise here on the basis of providing information for families on the value of education, providing schools with pedagogical resources, encouraging teacher attendance in remote areas, and additional tutoring. As in most reviews on the use of technology in schools, the evidence on EdTech is mixed (See et al., 2021a, 2021b). It depends on the application and context. Technology *per se* is probably not the solution to improving attainment at school.

Discussion

Limitations

As with most research of this scale it is inevitable that relevant studies will have been missed or misclassified. This is especially so for the studies on "other approaches" in the final substantive section. Our search was focused specifically on low- and middle-income countries (see keywords), and we supplemented the results with research from studies conducted in the US and England that was found, or was known to us from previous work. Work from other developed countries would have been included if found.

Possible implications

This review is unusual, but representative of a growing trend, in assessing the quality of each study before attempting to synthesise the whole. This has been shown to fundamentally change the findings of reviews such as meta-analyses, those that are simple vote counts, and those that use only quality of reporting criteria (Gorard, 2021). In a very real sense, the findings and apparent implications of syntheses of any kind that do not include explicit controls for the quality of uinderlying studies should now be ignored.

It is important for readers to note that the search yielded a much larger number of relevant studies than those cited here. But these were judged a 0 for quality, meaning that they added nothing to the overall evidence base.

The results in this paper suggest that policies involving the use of cash incentives have reasonably promising results, particularly in low-and middle-income countries. The stronger studies rated 3 🔒 and above mostly suggest that the use of direct monetary incentives have positive effects on children's learning outcomes, and can reduce the poverty attainment gap both locally and more widely. Therefore, for each cohort of students at risk of low attainment, for at least some of their years at schools, the use of cash transfers is indicated. The findings also suggest that the use of conditions attached to the funding is important. Perhaps, when conditions are attached there is an implicit penalty involved and it is this awareness of the consequences or returns from small compensations that are the motivators.

However, this may not be the strong policy recommendation that it appears. The three 3 🔒 studies that looked longer term found no long-term impact. There is no delayed effect and the benefit generally disappears when the incentives are withdrawn. The extrinsic motivation of money does not necessarily create greater intrinsic motivation, and may indeed harm it.

Several evaluations suggest that giving the funding to students to improve their performance directly or through enhanced extrinsic motivation does not work in many subject areas. Students also need to know how to improve their attainment. Therefore, paying them for the building blocks of improvement, such as for classroom behaviour or school attendance where students are more likely to know what to do, could be more promising. It might also be a better approach than providing the money to teachers or schools.

Offering monetary incentives presumably allows schools and teachers to use the incentives for programmes or resources that they judge will most benefit students in their own contexts. But one reason why policy makers might prefer using monetary incentives rather than intervening directly in the process of education is that we do not have enough safe knowledge yet about the most effective ways to improve education outcomes given the complex and heterogeneous characteristics of students, teachers and the school environment (Gorard et al., 2017). Creating and assembling this kind of knowledge should be a priority.

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