Unconditional cash transfers and child schooling: a meta-analysis

NSE Research Seminar

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Introduction

- *"By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes."* Target 4.1 Sustainable Development Goals.
- In 2018, one-fifth of children and youth remain out of school (United Nations, 2020).
- In 2021, out-of-school rates at 33.6% in low-income countries (UNESCO Institute for Statistics, 2021).
- *Demand-side* interventions found to be effective in increasing student participation in schools.

Introduction

- Subsidising school fees improve school enrolment and attendance in developing countries (Deininger 2003; Borkum 2012; Blimpo et al. 2019; Brudevold-Newman 2021).
- **However!**
- Less effective when there is high labour market opportunity cost (Garlick, 2013).
- Less effective when others costs for education (e.g., textbooks, uniforms, travel, etc.) are high (J-PAL, 2017; Sakaue, 2018).

Introduction

- Conditional cash transfer programmes (CCTs) widely tested and found effective (World Bank, 2018).
- **However!**
- Targeting and conditionality make CCTs expensive to administer (Benhassine et al. 2015; Özler 2020).
- CCTs potentially exclude the neediest group when conditions discourage household to apply (Baird et al., 2011).
- Conditions could distort optimal decision-making if households are fully rational (Hanlon et al., 2010).
- Conditions could be misunderstood (especially in complex CCT designs), making the benefits of conditionality obscure.

Introduction

- With the benefits of conditionality questionable, unconditional cash transfer programmes (UCTs) have become increasingly popular.
- In Malawi, CCTs have a larger gain in enrolment but UCTs reduce dropout rates by 43% as much (Baird et al., 2011).
- In Morocco, a UCT labelled for education purposes has positive effects on participation (Benhassine et al., 2015).
- There is growing evidence for the schooling impacts of UCTs.

Research Goals

- Synthesise the existing evidence for schooling impacts of UCTs through a systematic review.
- Examine the overall effects of UCTs on enrolment and attendance using meta-analysis.
- What factors explain effect size heterogeneity (i.e., difference in effect sizes between UCTs)?

Theoretical Framework

- Demand for schooling depends on the expected benefits to schooling (e.g., future earnings) and present discounted costs of schooling (Becker, 1962; Becker, 1975).
- There is a trade-off between earnings from child labour and education (Mincer, 1974).
- Two equilibria in the labour market: (1) children work and (2) adult income is high and children do not work (Basu and Van, 1998).

Cash Transfer Programmes

- Cash transfers and conditions work through (1) a positive income effect which increases enrolment of all children in household and (2) a positive substitution effect through reducing the opportunity cost of schooling (Ferreira et al., 2017).
- Ignoring conditionality, cash transfers increase non-employment income of adults, and greater transfer should lead to greater increased student participation, i.e., a pure income effect (García and Saavedra, 2016).
- W.r.t. UCTs, if the income effect is stronger than the substitution effect of transfers, the schooling effect is larger when the economy has higher average levels of income or a smaller fraction of poor households Churchill et al., 2021).

UCT Evaluations

- Myriad of evaluation studies on the schooling effects of UCTs utilising causal inference methods.
- Randomised controlled trials (Oosterbeek et al., 2008; Baird et al., 2011; Covarrubias et al., 2012; Benhassine et al., 2015; Akresh et al., 2016).
- Difference-in-differences (de Carvalho Filho, 2012; Ponczek, 2011).
- Regression discontinuity design (Skoufias and McClafferty, 2001; Attanasio et al., 2010; Bergolo and Galván, 2018).
- Propensity score matching (Veras Soares, 2010; Coetzee, 2013).

UCT Evaluations

- In Ecuador, pure income effect of a cash transfer of $15 per month for households in the first quintile of the poverty index strengthens the financial position of poor households would allow them to increase consumption and investment in education (Oosterbeek et al., 2008).
- In Malawi, cash transfer increases school attendance and investment in household-oriented productive farm or non-farm activities (Covarrubias et al., 2012).
- Cash transfers through poverty reduction programmes (in Zambia, Lebanon, and Mali) and pension programmes (in Brazil and Bolivia) also have the income effect on children's school participation.

Existing Systematic Reviews and Meta-Analyses

- Systematic reviews on cash transfer programmes find positive schooling effects, but only three of the six include a meta-analysis and none has focused solely on UCTs.
- The effect sizes for student participation are always larger for CCTs compared to UCTs, particularly those with more stringent conditions and enforcement, though the difference is not statistically significant (Baird et al., 2014).
- García and Saavedra (2017) meta-analyse 47 CCTs and find no correlation between programme features and effect sizes in student participation.
- Snilstveit et al. (2016) review 38 unique cash transfer programmes (only 3 are UCTs).
- This is the first meta-analysis for 38 studies from 22 UCTs focusing on school enrolment and attendance.

Data Collection

- Constructed a list of 157 UCT programmes in 131 countries using World Bank's (2015, 2018) Social Safety Net Inventory.
- Found a total of 152 impact evaluation studies for 90 programmes in 64 countries (limited to studies in English).
- Added another 12 studies after cross-validating with existing systematic reviews, bringing total to 164 studies.

Study Eligibility

- Studies must report common metric characteristics such as regression-based estimates of student participation (enrolment or attendance), and t-statistic, standard errors or p-values that could be converted to effect sizes weighted by their standard errors.
- Include only *ex post* evaluation studies that utilise a treatment-comparison research design (experimental or quasi-experimental).
- Include both studies published in academic journals as well as "grey literature" (i.e., unpublished working papers, technical reports, conference papers, and dissertations).
- Total of 38 eligible studies.

Coding Effect Sizes and Standard Errors

- We take the "best" effect size estimate of student participation from the most complete model (i.e., the most comprehensive set of control variables).
- Effect sizes are in log-odds ratio, which we exponentiate to obtain the odds ratio.
- For studies that report effect sizes for multiply non-overlapping subgroups, we synthesise the "best" effect sizes of the subgroups into an average using a fixed-effect meta-analysis model.
- For studies that do not report standard error, we convert t-statistics or p-values into standard errors.

Coding Other Variables

- Binary variable for whether the programme is a pilot at the time of evaluation.
- Record the transfer amount in each paper in 2010 USD.
- Obtain income per capita and poverty headcount ratio for the country in which the programme is administered.
- Code risk of bias in three ordinal categories based on the International Development Coordinating Group (IDCG).

Summary Statistics

	Number	%
Publication type		
Journal article	17	44.7
Working paper	11	28.9
Technical report	4	10.5
PhD thesis	2	5.3
Master's thesis	2	5.3
Undergraduate dissertation	1	2.6
Conference paper	1	2.6
Total number of studies	38	
Reports effects on		
Enrolment	30	78.9
Attendance	12	31.6
Regional distribution		
Africa	21	55.2
Latin America and the Caribbeans	9	23.7
Middle East	4	10.5
South Asia	2	5.3
Eastern Europe and Central Asia	2	5.3
Programme characteristics		
Pilot programme	10	26.3
Randomised controlled trial	7	18.4
Risk of bias		
Selection bias and confounding - Yes	17	44.7
Spillovers, crossovers, and contamination - Yes	37	97.4
Outcome reporting - Yes	34	89.5
Analysis reporting - Yes	29	76.3
Other risk of bias - Yes	10	26.3
Overall risk of bias - Low	14	36.8
Overall risk of bias - Middle	15	39.5
Overall risk of bias - High	9	23.7

Meta-Analysis Method

We use a random-effects model to get the summary UCT effect size:

$$ES_{UCT} = \frac{\sum_i w_i ES_i}{\sum_i w_i} \tag{1}$$

where ES_i is the effect size of paper i, and w_i is the associated weight for the ith estimate:

$$w_i = \frac{1}{\hat{\sigma}_i^2 + \tau^2} \tag{2}$$

where $\hat{\sigma}_i^2$ is the within-study variance (square of the standard error reported in paper i) and τ^2 is the between-studies variance.

Meta-Analysis Method

τ^2 can only be computed if the true effect sizes of all papers are known. We use the DerSimonian and Laird (1986) method to obtain a sample estimate for τ^2:

$$\hat{\tau}^2 = \frac{Q - (k-1)}{C} \tag{3}$$

where Q is the weighted sum of squares of the effect sizes reported by paper i, $k-1$ is the degrees of freedom or the number of studies minus one, and C is a factor to standardise the estimate into the same index as the within-study variance.

$$Q = \sum_{i=1}^{k} w_i ES_i^2 - \frac{(\sum w_i ES_i)^2}{\sum w_i} \tag{4}$$

$$C = \sum_{i=1}^{k} w_i - \frac{\sum w_i^2}{\sum w_i} \tag{5}$$

Heterogeneity in Effect Size Estimates

We compute the I^2 statistic to show the extent of heterogeneity:

$$I^2 = \frac{\hat{\tau}^2}{\hat{\tau}^2 + \hat{\sigma}^2} \tag{6}$$

The I^2 statistic indicates the percentage of all variability in effect size estimates due to heterogeneity (Higgins and Thompson, 2002).

Meta-Regression

To test how programme characteristics and country-specific characteristics explain heterogeneity in effect size estimates, we estimate the following study-level meta-regression:

$$ES_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + \beta_4 D_{pilot} + e_i \tag{7}$$

where x_{1i} is income per capita, x_{2i} is poverty headcount ratio, x_{3i} is the transfer amount, and D_{pilot} is a binary variable equal to one if the programme is a pilot.

Summary Effect Sizes

Table 2 Meta-analysis results

		Overall Effect Size (p-value)	95% confidence interval	τ^2	I^2	Chi-squared statistic (p-value)	N
Enrolment	(1)	1.045 (0.000)	[1.030, 1.060]	0.0007	0.710	99.95 (0.0000)	30
Attendance	(2)	1.029 (0.005)	[1.009, 1.050]	0.0005	0.695	36.09 (0.0002)	12
Enrolment (Studies with high risk of bias excluded)	(3)	1.064 (0.000)	[1.042, 1.086]	0.0014	0.709	75.54 (0.0000)	23
Attendance (Studies with high risk of bias excluded)	(4)	1.033 (0.034)	[1.002, 1.064]	0.0013	0.706	30.66 (0.0003)	10

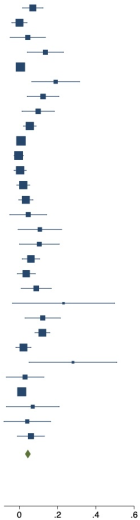
Summary Effect Sizes

Study	Probability of Enrolment in Percentage Points with 95% CI	Weight (%)
(Bolivia) BONOSOL pension programme - Martinez (2004)	0.07 [0.02, 0.12]	3.73
(Bolivia) Renta Dignidad Social Pension - Hernani-Limarino and Mena (2015)	0.00 [-0.04, 0.04]	4.82
(Brazil) Old Age Pension - de Carvalho Filho (2012)	0.04 [-0.05, 0.14]	1.85
(Burkina Faso) Nahouri Cash Transfers Pilot Project - Akresh, de Walque, Kazianga (2016)	0.14 [0.04, 0.23]	1.79
(Ecuador) Bono de Desarrollo Humano - Araujo, Bosch, and Schady (2017)	0.00 [-0.01, 0.02]	7.00
(Ecuador) Bono de Desarrollo Humano - Edmonds and Schady (2012)	0.19 [0.06, 0.32]	1.12
(Ecuador) Bono de Desarrollo Humano - Oosterbeek, Ponce, and Schady (2008)	0.12 [0.04, 0.21]	2.18
(Ecuador) Bono de Desarrollo Humano - Schady and Araujo (2006)	0.10 [0.01, 0.18]	2.11
(Gambia) Girls Scholarship Programme - Gajigo (2014)	0.05 [0.02, 0.09]	5.34
(Georgia) Targeted social assistance - Abramishvil and Lanchava (2015)	0.01 [0.00, 0.02]	7.31
(Georgia) Targeted social assistance - Econometria Evaluation Team et al. (2020)	-0.00 [-0.03, 0.02]	6.23
(Ghana) Livelihood Empowerment Against Poverty (LEAP) - de Groot et al. (2015)	0.00 [-0.03, 0.04]	5.52
(Kenya) CT-OVC - Kenya CT-OVS Team (2012)	0.02 [-0.01, 0.05]	5.34
(Kenya) CT-OVC - Ward et al. (2010)	0.03 [-0.00, 0.07]	5.02
(Lebanon) Min Ila Programme - de Hoop et al (2019)	0.05 [-0.05, 0.14]	1.73
(Lebanon) Multipurpose Cash Assistance - Chaaban et al. (2020)	0.11 [-0.01, 0.22]	1.33
(Lebanon) Multipurpose Cash Assistance - Saita et al. (2022)	0.10 [0.00, 0.21]	1.53
(Lebanon) Winterisation Cash Programme - Lehmann and\Masterson (2014)	0.06 [0.01, 0.11]	4.32
(Lesotho) Child Grants Program (CGP) - Pace et al. (2018)	0.04 [-0.01, 0.08]	4.17
(Lesotho) Child Grants Program (CGP) - Sebastian et al. (2019)	0.09 [0.01, 0.17]	2.33
(Malawi) SIHR - Baird, McIntosh, and Ozler (2011)	0.23 [-0.04, 0.50]	0.28
(Malawi) Social Cash Transfer Scheme - de Hoop et al (2019)	0.12 [0.03, 0.21]	1.85
(Malawi) Social Cash Transfer Scheme - Kilburn et al. (2017)	0.12 [0.08, 0.16]	4.82
(Mali) Unconditional cash transfer programme in Gao and Sikasso - Sessou and Henning (2019)	0.02 [-0.02, 0.06]	4.82
(Pakistan) Benazir Income Support Programme (BISP) - Churchill et al. (2021)	0.28 [0.05, 0.51]	0.38
(Pakistan) Benazir Income Support Programme (BISP) - Durr-e-Nayab and Farooq (2014)	0.03 [-0.07, 0.13]	1.68
(South Africa) Child Support Grant - Case et al. (2005)	0.01 [-0.01, 0.03]	6.57
(South Africa) Child Support Grant - Coetzee (2010)	0.07 [-0.07, 0.21]	0.96
(South Africa) Old Age Pension - Siaplay (2012)	0.04 [-0.08, 0.16]	1.19
(Zambia) Child Grant Programme - AIR (2014)	0.06 [-0.01, 0.13]	2.68
Overall	0.04 [0.03, 0.06]	

Heterogeneity: $\tau^2 = 0.00$, $I^2 = 70.99\%$, $H^2 = 3.45$

Test of $\theta_i = \theta_j$: $Q(29) = 99.95$, $p = 0.00$

Test of $\theta = 0$: $z = 5.99$, $p = 0.00$

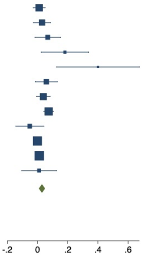


Random-effects DerSimonian–Laird model

Figure 1 Impact of UCTs on enrolment

Summary Effect Sizes

Study	Probability of Attendance in Percentage Points with 95% CI	Weight (%)
(Bolivia) Renta Dignidad Social Pension - Hernani-Limarino and Mena (2015)	0.01 [-0.03, 0.05]	11.54
(Brazil) Old Age Pension - Ponczek (2011)	0.03 [-0.03, 0.09]	7.82
(Burkina Faso) Nahouri Cash Transfers Pilot Project - Akresh, de Walque, Kazianga (2016)	0.07 [-0.02, 0.15]	4.50
(Cameroon) Cash Transfer Pilot - Yavuz (2019)	0.18 [0.02, 0.34]	1.54
(Ecuador) Bono de Desarrollo Humano - Ballesteros (2018)	0.40 [0.13, 0.67]	0.53
(Malawi) SIHR - Baird, McIntosh, and Ozler (2011)	0.06 [-0.01, 0.13]	5.64
(Malawi) Social Cash Transfer Scheme - Covarrubias, Davis, and Winters (2012)	0.04 [-0.01, 0.08]	10.13
(Morocco) Tayssir - Benhassine et al. (2013)	0.07 [0.04, 0.10]	13.66
(Rwanda) Concern Worldwide Graduation Programme - Sabates et al. (2019)	-0.05 [-0.14, 0.04]	3.87
(South Africa) Child Support Grant - Santana (2008)	-0.00 [-0.02, 0.01]	18.11
(South Africa) Child Support Grant - Williams (2007)	0.01 [0.01, 0.02]	19.99
(Zambia) Child Grant Programme - AIR (2014)	0.01 [-0.11, 0.13]	2.67
Overall	0.03 [0.01, 0.05]	



Heterogeneity: $\tau^2 = 0.00$, $I^2 = 69.52\%$, $H^2 = 3.28$

Test of $\theta_i = \theta_j$: $Q(11) = 36.09$, $p = 0.00$

Test of $\theta = 0$: $z = 2.79$, $p = 0.01$

Random-effects DerSimonian–Laird model

Figure 2 Impact of UCTs on attendance

Summary Effect Sizes

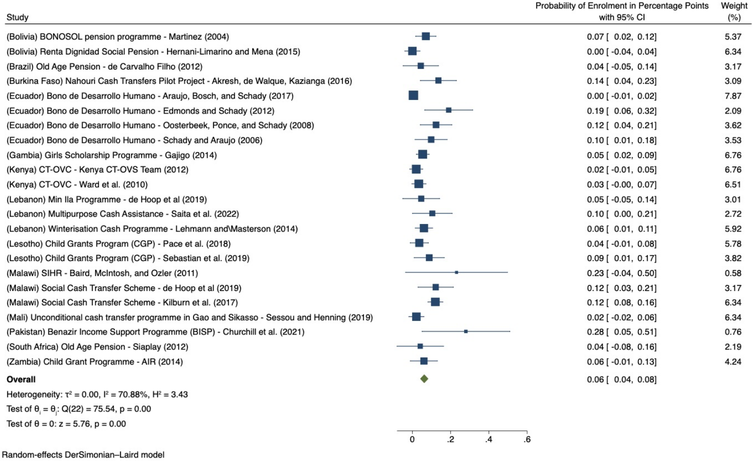


Figure 3 Impact of UCTs on enrolment (high risk of bias studies are excluded)

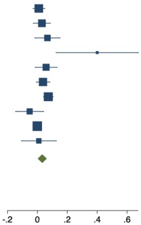
Summary Effect Sizes

Study		Probability of Attendance in Percentage Points with 95% CI	Weight (%)
(Bolivia) Renta Dignidad Social Pension - Hernani-Limarino and Mena (2015)		0.01 [-0.03, 0.05]	14.01
(Brazil) Old Age Pension - Ponczek (2011)		0.03 [-0.03, 0.09]	11.07
(Burkina Faso) Nahouri Cash Transfers Pilot Project - Akresh, de Walque, Kazianga (2016)		0.07 [-0.02, 0.15]	7.48
(Ecuador) Bono de Desarrollo Humano - Ballesteros (2018)		0.40 [0.13, 0.67]	1.12
(Malawi) SIHR - Baird, McIntosh, and Ozler (2011)		0.06 [-0.01, 0.13]	8.85
(Malawi) Social Cash Transfer Scheme - Covarrubias, Davis, and Winters (2012)		0.04 [-0.01, 0.08]	13.00
(Morocco) Tayssir - Benhassine et al. (2013)		0.07 [0.04, 0.10]	15.34
(Rwanda) Concern Worldwide Graduation Programme - Sabates et al. (2019)		-0.05 [-0.14, 0.04]	6.65
(South Africa) Child Support Grant - Santana (2008)		-0.00 [-0.02, 0.01]	17.56
(Zambia) Child Grant Programme - AIR (2014)		0.01 [-0.11, 0.13]	4.91
Overall		0.03 [0.00, 0.06]	

Heterogeneity: $\tau^2 = 0.00$, $I^2 = 70.64\%$, $H^2 = 3.41$

Test of $\theta_i = \theta_j$: $Q(9) = 30.66$, $p = 0.00$

Test of $\theta = 0$: $z = 2.12$, $p = 0.03$



Random-effects DerSimonian–Laird model

Figure 4 Impact of UCTs on attendance (high risk of bias studies are excluded)

Meta-Regression

Table 3 Moderating effects of programme and country characteristics

	(1) Enrolment	(2) Attendance	(3) Enrolment (high risk of bias studies excluded)	(4) Attendance (high risk of bias studies excluded)
Pilot dummy	1.091 (1.830)	4.295 (3.049)	−1.719 (2.597)	2.296 (5.143)
Transfer amount (in USD 100)	0.258 (0.231)	0.155 (0.576)	−0.059 (0.363)	−0.303 (1.044)
Income per capita (in USD 1,000)	−0.379 (0.469)	0.140 (0.541)	−0.198 (0.708)	0.808 (1.215)
Poverty headcount ratio	0.050 (0.054)	−0.054 (0.073)	−0.019 (0.097)	-0.120 (0.135)
Constant	2.348 (3.081)	3.011 (4.822)	8.450 (5.507)	6.565 (8.328)
N	30	12	23	10

Notes: The specification of study-level effect size on the moderators is estimated using a random-effects meta-regression, weighted by the inverse of the effect size variance and between-study variance. The estimates of the coefficients are in odds ratios. The numbers in parentheses are standard errors. *N* denotes the number of studies used in the meta-analysis.

Meta-Regression

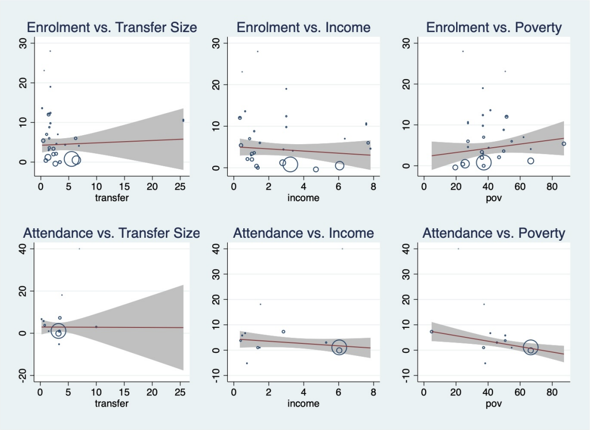


Figure 5 Bubble plots

Notes: Effect sizes for enrolment and attendance in percentage points are graphed on the y-axes, while the individual moderators are graphed on the x-axes. Bubbles indicate the observations (effect sizes), and the size of the bubbles corresponds to the weight of the observation (inversely related to its standard error). The red lines denote a linear predicted regression, and the grey shaded areas denote the corresponding 95-percent confidence interval. Transfer size is in units of USD 100 and income per capita is in units of USD 1,000.

Meta-Regression

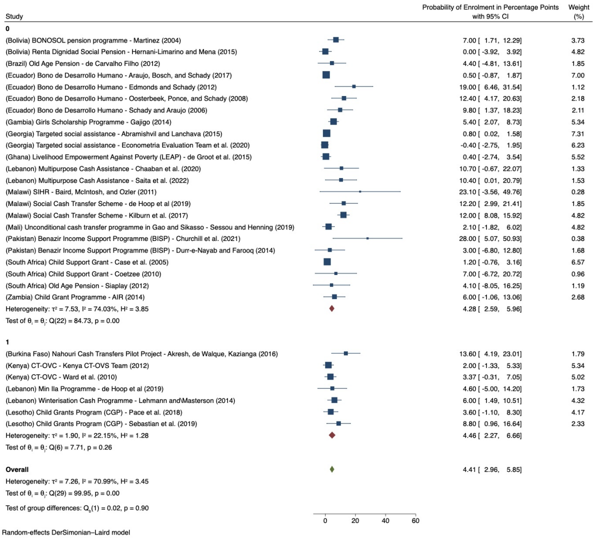


Figure 6 Subgroup analysis of UCT impact on enrolment (pilot vs. non-pilot)

Meta-Regression

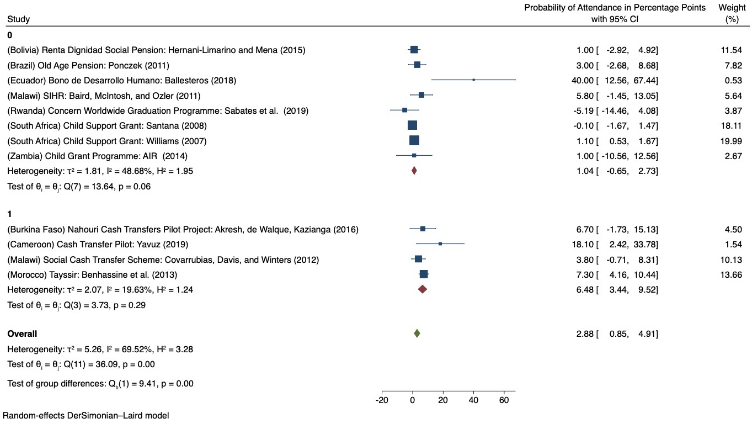


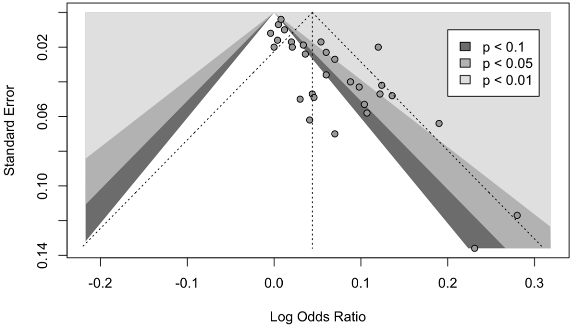
Figure 7 Subgroup analysis of UCT impact on attendance (pilot vs. non-pilot)

Publication Bias

- It is possible that some relevant studies and non-significant results are being under-reported in the literature. This non-random missing data could be a source of bias.
- We plot effect sizes against standard errors in a funnel plot. In the absence of small-study effects, we expect to observe a roughly symmetric inverted funnel (Peters et al., 2008).
- Publication bias may be present if studies are missing in the non-significant regions.

Funnel Plot for Enrolment

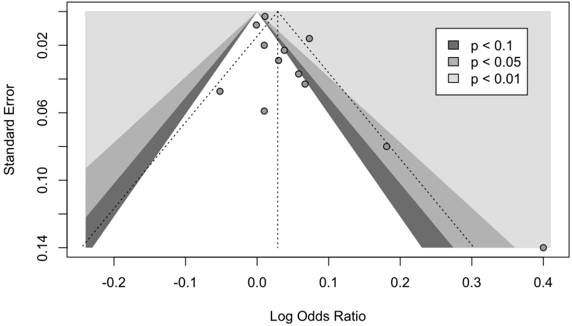
The bottom of the non-significant region of the contour funnel is empty, which implies the presence of potential publication bias perhaps because of omission of smaller papers and those with larger standard errors.



An Egger's regression test (Egger et al., 1997) indicates that the asymmetry for enrolment is statistically significant ($p = 0.000$).

Funnel Plot for Attendance

A symmetric distribution of papers at the top of the dotted funnel, but most of the papers report non-significant results.



Fail to reject symmetry in Egger's regression test ($p = 0.0687$).

Bias-Corrected Summary UCT Effect Sizes

Bias-corrected summary effect sizes remain positive and statistically significant.

Table 4 Bias-corrected overall UCT effect size for enrolment

Correction method		Overall effect size (p-value)	95% confidence interval	τ^2	I^2	Chi-squared statistic (p-value)	N
Remove outliers	(1)	1.0429 (0.0000)	[1.0283, 1.0578]	0.0007	0.708	92.42 (0.0000)	28
Trim and fill	(2)	1.0168 (0.0344)	[1.0012, 1.0327]	0.0014	0.775	190.95 (0.0000)	44
Limit meta analysis	(3)	1.0165 (0.0870)	[0.9976, 1.0358]	0.0014	0.710	99.95 (0.0000)	30

Notes: Overall effect sizes are in odds ratio. In the third and fourth columns, studies with high risk of bias are removed from the meta-analysis. The between-studies variance τ^2 is estimated using the DerSimonian-Laird method. I^2 statistics indicate the percentage of all variability in effect size estimates that is due to heterogeneity. Chi-squared statistics for test of homogeneity are presented with corresponding p-values. N denotes the number of papers used in the meta-analysis.

Summary of Findings

- Unconditional cash transfers seem to encourage student participation: on average, the odds of a child being enrolled in school and attending school, respectively, is 4.4% and 2.9% higher for households that receive a cash transfer, and the estimates are statistically significant and robust to the exclusion of studies with high risk of bias.
- High levels of between-study heterogeneity.
- No statistically significant moderating effect of whether the UCT is pilot and transfer amount (Baird et al., 2014; García and Saavedra, 2017).
- No evidence that the schooling effect of UCTs is moderated by income per capita and poverty headcount ratio.

Conclusion

- Small incentives in the form of both cash or non-cash transfers can be effective in increasing enrolment and attendance (J-PAL, 2017) through a "nudge" (Benhassine et al., 2015) or by addressing perception gaps (Glewwe and Muralidharan, 2015; J-PAL, 2017).
- Evaluations of UCTs remain under-researched and can be low-hanging fruits for researchers to increase the evidence base for UCTs.
- Little remains known about the causes of effect size heterogeneity between studies.

Thank You

References

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