



## Supplementary Material for

### **Poverty, depression, and anxiety: Causal evidence and mechanisms**

Matthew Ridley, Gautam Rao, Frank Schilbach\*, Vikram Patel

\*Corresponding author. Email: fschilb@mit.edu

Published 11 December 2020, *Science* **370**, eaay0214 (2020)  
DOI: 10.1126/science.aay0214

**This PDF file includes:**

Supplementary Text  
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## Supplementary Text: Estimation of figure 4 and meta-analysis

### Estimation of Figure 4

We focused our review on experimental studies that examined the impact of two types of poverty alleviation programs across low- or middle-income countries and measured a mental health outcome. Specifically, we identified RCTs that studied the impact of unconditional cash transfers or multi-faceted anti-poverty programs on mental health outcomes: depression, anxiety, stress, a mental health index, and/or a psychological well-being index. We employed JSTOR, Google, and Google Scholar and used combinations of the keywords: “*cash transfer*”, “*poverty alleviation*”, “*anti-poverty programs*”, and “*graduation programs*”, with “*mental health*”, “*depression*”, “*anxiety*”, “*psychological well-being*”, “*stress*”, “*randomized*”, and “*RCTs*”. We reviewed the literature cited in each of the studies that met our criteria to identify additional studies. We also reviewed the studies cited in various review papers and reports (156–160). We identified 30 studies that met our criteria. We briefly describe each of these below.

We conducted a meta-analysis using a Bayesian random effects model that was implemented using R’s *baggr* Rubin (1981) model (161) with normal priors (0,0.1) on the hyper-standard deviation. The bottom panel of figure 4 in the main text shows the estimated posterior treatment effects using this model, separately by type of transfer and overall. Where multiple studies evaluated the same intervention, or a study featured multiple follow-up surveys, to avoid double-counting we included only the treatment effect which was measured most recently (i.e., the longest-run effect). The overall impact of anti-poverty programs was 0.094 SD (95% CI: 0.040, 0.147). An Egger test of funnel plot symmetry (162) failed to reject the null hypothesis of no publication bias ( $p = 0.96$ ).

Figure S1 below reproduces Figure 4 but with all available follow-up measures from all studies included (thus double-counting some interventions). The overall impact of anti-poverty programs when measured this way was 0.109 SD (95% CI: 0.065, 0.153).

### Multi-Faceted Anti-Poverty Programs

1. **Blattman et al. (2019)**. This study compared the impact of an industrial job offer to young, mostly female job seekers in Ethiopia with the impact of a package consisting of a cash grant (worth about \$300) and five days of microenterprise training. The number reported in this meta-analysis is the effect of the cash grant and training package on a mental health and subjective well-being index, which includes measures of depression and generalized anxiety symptoms.

The total operating cost of the cash grant and training package was \$450 MER.

2. **Green et al. (2016)**. This study examines the impact of a poverty alleviation program, *Women’s Income Generating Support (WINGS)*, on economic security

and symptoms of depression of vulnerable women in Northern Uganda. The program consisted of: (i) business skills training, (ii) an individual start-up grant worth \$150, and (iii) home visits to provide advice and encouragement to use the grant. The follow-up survey was conducted 1.3 years after the intervention was rolled out. They used APAI-R, a locally developed short survey instrument to measure symptoms of depression.

The average cost of the program per household was \$2,150 PPP (Blattman et al., 2016), and includes individual start-up grant, targeting and disbursement, supervisory visits, training (business and group dynamics), and other costs.

- 3. Banerjee et al. (2015).** This study examines the results from six RCTs that study the impact of a transfer package including: a productive asset (one time transfer), consumption support, technical skills training, high-frequency home visits, savings, and some health education. This was conducted across six different countries: Ethiopia, Ghana, Honduras, India, Pakistan, and Peru. The key outcome measures include consumption, assets, food security, finance, time use, income, physical health, mental health, political involvement, and women's decision-making. Two follow-up surveys were conducted: 2 years after the intervention (endline 1), and 3 years after the intervention (endline 2). The psychological well-being index was measured as an average of self-reported happiness, a stress index, and an indicator for having experienced anxiety lasting more than 30 days in the past year.

The average cost of the program per household, across the six programs, was \$3,717 PPP (Table 4), and includes direct transfer costs (asset cost and food stipend), supervision costs, and indirect costs.

- 4. Bandiera et al. (2017).** This study evaluates an anti-poverty program in Bangladesh that transferred a productive asset (livestock) and skills training to poor women, who mostly engage in seasonal casual labor. The intervention was randomized across 21,000 households (6,700 ultra-poor) in 1,309 villages. The key outcome measures include labor supply and earnings of women, consumption, household, financial assets, and mental health. The follow-up survey was conducted 4 years after the intervention was started. The psychological well-being index was measured as an average of self-reported happiness and an indicator for having experienced anxiety lasting more than 30 days in the past year.

The average cost of the program per household was \$1,120 PPP (Table 9 in Bandiera et al. 2017).

- 5. Banerjee et al. (2016).** This study examines the long-run impact of an anti-poverty program, Bandhan's "*Targeting the Hard Core Poor program*", in West Bengal, India. The beneficiaries of the program receive a productive asset, consumption support, technical skills training, general life skills coaching,

savings, and some health education. The follow-up surveys were conducted at various stages: 1.5 years after the intervention (endline 1), 3 years after the intervention (endline 2), and 7 years after the intervention (endline 3). The psychological well-being index was measured as an average of self-reported happiness, stress index, and an indicator for having experienced anxiety lasting more than 30 days in the past year.

The average cost of the program per household was \$1,257 PPP, and includes direct transfer costs (asset cost and food stipend), supervision costs, and indirect costs. This was estimated from Table 4 in Banerjee et al. (2015).

6. **Bedoya et al. (2019).** This study examines the impact of a graduation program (TUP package) — consisting of a transfer of a productive asset, monthly cash transfer, basic training, health subsidy, and mentoring visits — in the Balkh region in Afghanistan. They conducted a household-level randomization of 1,219 households in 80 villages, where 491 households received the TUP package. The key outcome measures include consumption, assets, financial inclusion index, psychological well-being index, women's empowerment index, and time spent working. The program lasted for 12 months and the follow-up surveys were conducted 1 year after the program was completed. The psychological well-being index was measured as a weighted average of scores on the CES-D, the happiness and life satisfaction questions from the World Values Survey (WVS), Cohen's stress scale, and the log cortisol levels obtained from saliva samples.

The average cost of the program per household was \$6,198 PPP (Table 9 in Bedoya et al. 2019), and includes direct transfer costs (asset cost, food stipend, and health voucher), supervision costs, and indirect costs.

7. **Janzen et al. (2018).** This study examines the short-run impact of an anti-poverty program, *Heifer International's (HI) Smallholders in Livestock Value Chain* program in Nepal. The beneficiaries of this program receive a package that includes: group formation, livestock, technical skills training, and value-based training. The follow-up survey was conducted 1.5 years after the intervention. The psychological well-being index includes measures for depression, life satisfaction, self-esteem, and worry.

The average cost of the program per household was \$137 MER, and includes direct transfer costs and indirect costs.

8. **Ismayilova et al. (2018).** This study examines the impact of a graduation program (TUP package) — consisting of savings group formation and training, livelihood training and planning, seed capital grants and one-on-one mentoring, and family counseling on child's mental health — in Burkina Faso. The follow-up surveys were conducted at various stages: 1 year after the intervention (endline 1), and 2 years after the intervention (endline 2). CES-D was used to measure psychological well-being.

The average cost of the program per household was \$279 PPP.

- 9. Edmonds and Theoharides (2020).** This study examines the impact of an anti-poverty program, *KASAMA* in the Philippines, on child labor elimination. The beneficiaries of the program receive a productive asset, and training related to operating a business and child labor. The follow-up survey was conducted 3 years after the intervention was rolled out. The child well-being index includes depression, child life satisfaction, enumerator assessment of social behavior, and caregiver assessment of child's strengths and difficulties.

The average cost of the program per household was \$518 PPP.

- 10. Glass et al. (2017).** This study examines the impact of a livestock transfer program, *PPF*, on economic, health, and women's empowerment in the Democratic Republic of Congo. The beneficiaries of the program receive a livestock productive asset. The follow-up survey was conducted 1.5 years after the intervention. They measured depression and anxiety using the Hopkins Symptoms Checklist (HSCL).

Implementation cost data was not available for this program; instead, we use the estimated average value of livestock transferred per participant, calculated from table 2 (\$66 PPP).

### Cash Transfers

- 1. Hjelm et al. (2017).** This study uses secondary data to examine the impact of two unconditional cash transfer programs: (i) *Zambia Child Grant Program (CGP)* that targets households with a child under the age of five, and (ii) *Zambia Multiple Category Cash Transfer Program (MCP)* that targets households under different categories.

In the figures, Hjelm et al. (2017a) is the estimated treatment effect of *CGP*, and Hjelm et al. (2017b) is the effect of *MCP*.

These programs were conducted by the Zambian Government. *CGP* was randomized across 90 communities and across households within treated communities, for a total sample size of 2,515 households. *MCP* was randomized across 92 communities and across households within treated communities, for a total sample size of 3,078 households. Follow-up surveys were conducted 3 years after the intervention was rolled out. The key outcome measures include stress, consumption, food security, and non-productive assets. Stress was measured using the negatively worded items from Cohen's perceived stress scale (PSS); in brief, this asks respondents how often they have felt upset, stressed, or that difficulties were out of control in the past 4 weeks.

Households included in the *CGP* and *MCP* programs received \$11 and \$12 per month respectively for 36 months. The average cash transfer per household under the *CGP* and *MCP* program was \$396 MER and \$432 respectively. Cost of implementation data was not available.

- 2. Blattman et al. (2017).** This study examined the effects of a cognitive behavioral therapy (CBT) program cross-randomized with an unconditional cash grant of around \$200. Participants were randomized into four groups, receiving either (i) both the CBT and then the cash grant, (ii) only the CBT, (iii) only the cash grant, or (iv) neither. Key outcome measures included antisocial behavior such as crime and economic performance and preferences. In our meta-analysis we include the effects of the cash grant for those who did *not* receive the CBT intervention (i.e., the comparison between (iii) and (iv)) on an index of depression and mental distress, which asked about depressive symptoms, bad thoughts or feelings, and worry.

The authors report the average size of the cash grant as \$216 and the registration and administration costs for both programs as \$125, at market exchange rates. We conservatively assume that all of the latter costs are fixed and thus estimate the implementation cost of the cash transfer program as  $\$216 + \$125 = \$341$  MER.

- 3. Haushofer et al. (2020).** This study examines the impact of cash transfers and health insurance on 789 informal Kenyan workers. The workers were randomized into three groups: the first received a free health insurance policy, the second an unconditional cash transfer (worth the price of the policy), and the third received no intervention. The key outcome measures include insurance ownership, assets, willingness to pay for insurance, labor mobility, labor productivity, job risk, psychological well-being index, and log cortisol levels. The coverage was for 1 year and follow-up surveys were conducted a year after the completion of the program. The psychological well-being index was measured as self-reported well-being (stress and depression) and log cortisol levels.

The average cash transfer per household was \$338 PPP.

- 4. Blattman, Fiala, and Martinez (2019).** This study revisited a randomized cash grant program, the *Youth Opportunities Program (YOP)* in Uganda to examine its long-term effects. While applicants had to apply in small groups and submit a business proposal, the grants were unconditional once awarded. About half of 535 eligible groups were randomized to receive the money, which for most was between \$200-\$600 per person. Key outcomes included employment, earnings, and consumption.

Implementation cost data was not available for this program; instead, we use the average grant per participant (\$382 MER).

5. **Egger et al. (2019).** This study examines the impact of the GiveDirectly Cash Transfer Program in Kenya, across 653 villages using a two-level randomization. All households in the treatment villages received a one-time cash transfer (\$1000 MER). The key outcome measures include economic activities, asset ownership, psychological well-being, health and nutrition. The follow-up survey was conducted 1.5 years after the intervention was rolled out. The psychological well-being index was measured using depression, happiness, life satisfaction, and stress scales.

The households received transfers in three payments: \$151 PPP for completion of enrollment, and \$860 PPP each in two installments. The average cash transfer per household was \$1871 PPP.

6. **Paxson and Schady (2010).** This study examines the effect of an Ecuadorian cash transfer program, the *Bono de Desarrollo Humano (BDH)*, which provided unconditional cash transfers averaging \$10.51 per month to eligible mothers. The program was randomized across 77 rural and 41 urban parishes, though the authors only report results from rural parishes. Key outcome measures are cognitive, behavioral, and physical outcomes for children. The paper also reports effects of *BDH* on mothers' mental health as measured by the CES-D depression scale.

As implementation costs were not available, we report a rough estimate of average transfer value: \$10.51/month x 17 months = \$179 MER on average from start to endline.

This study evaluates the same intervention as Fernald and Hidrobo (2011). Both studies evaluated the same intervention at the same follow-up date; we exclude Paxson and Schady from the main meta-analysis in Figure 4 because they report results from a smaller subsample (rural parishes only). (This also explains why the average transfer value is different between these two studies).

7. **Baird et al. (2013).** This study examines the effects of a cash transfer program — unconditional and conditional cash transfers — in Malawi on the mental health among adolescent girls. The key outcome measures include psychological well-being and school attendance. Randomization was conducted at enumerator-area level, and a sample of 3,796 young women was stratified into two groups: baseline school dropouts and baseline schoolgirls. Two follow-up surveys were conducted: 1 year after the intervention was rolled out (endline 1), and 2 years after the intervention was rolled out (endline 2). In both the follow-up surveys, the GHQ-12 instrument was used to measure psychological well-being; in endline 2, MHI-5 (Mental Health Inventory-5) was also used.

The monthly transfer amount varied according to the enumeration area (\$4 to \$10) and the school-age (\$1 to \$5). They also covered the school fees for the girls in

secondary school, which amounted to \$60. This program was for a year. The average transfer amount per household was \$180 MER.

8. **Kilburn et al. (2016).** This study examines the effects of Kenya's *Cash Transfer Program for Orphans and Vulnerable Children*. The program was randomized across 28 locations, covering 1960 households. Treated households received monthly transfers of \$20. The key outcome measure is an indicator of depressive symptoms using the 10-question CES-D scale. The treatment effect we report in our meta-analysis is derived from the unadjusted means in the treatment and control groups reported in Table 2 of Kilburn et al. (Note standard errors are not adjusted for clustering).

Implementation cost data was not available; thus, we use the total undiscounted value of the transfer: \$20/month x 48 months = \$960 MER.

9. **Haushofer and Shapiro (2016).** This study examines the short-term effects of an unconditional transfer program from GiveDirectly in Kenya on poor households. Randomization was conducted at both household and village level, and the authors randomized gender of recipient, timing of transfer, and size of transfer. The key outcome measures include consumption, assets, financial inclusion index, and psychological well-being index. Follow-up surveys were conducted 9 months after the intervention was rolled out. The psychological well-being index was measured as a weighted average of scores on the CES-D, WVS, Cohen's stress scale, and the log cortisol levels obtained from saliva samples.

The households received transfers in varied magnitudes: \$404 PPP and \$1,525 PPP. The average transfer amount was \$709 PPP.

10. **Haushofer and Shapiro (2018).** This is a follow-up study to Haushofer and Shapiro (2016), and examines the long-term impacts of transfers on economic and psychological outcomes 3 years after the program by GiveDirectly in Kenya.

11. **Haushofer, Mudida and Shapiro (2020).** This study looks at the effects of an unconditional cash transfer program cross-randomized with five weeks of psychotherapy among 5,756 people in rural Kenya. Key outcome measures include consumption, assets and psychological well-being. Their psychological well-being index consists of the GHQ-12, Cohen's perceived stress scale, and the happiness and life satisfaction questions from the WVS.

The value of the transfer was \$1,076 PPP (\$485 MER). The authors conservatively assume a cost of delivery of 10% of the transfer value (section 4.4), reasonably given that the transfers are delivered by mobile money, implying a total implementation cost of \$1,184 PPP (\$534 MER).

12. **Angeles et al. (2019).** This study examines the impact of the Malawi Government's *Social Cash Transfer Program (SCTP)* on youth mental health,



with 2782 households across 29 villages. 1678 households across 14 villages received unconditional cash transfers and the recipients were encouraged to invest the money in the human capital of their children and basic needs of the households. The program spanned for 2 years and included bi-monthly payments. The follow-up surveys were conducted 2 years after the program was rolled out with the youth of the households (aged 15 to 22 years old during follow-up). CES-D was used to measure psychological well-being.

The monthly cash transfer value varied with household size (\$3 to \$7) and composition (\$1 and \$2) per primary and secondary school aged child). The program spanned two years. The average transfer amount per household was \$156 MER.

This study evaluates the same intervention as Kilburn et al. (2017).

- 13. Kilburn et al. (2019).** This study examines the impact of *HIV Prevention Trials Network (HPTN) 068*, a conditional cash transfer program in South Africa, on young women's health and behavior. This program was targeted at young women attending high school in rural areas of South Africa. The young girls and their parents received monthly cash transfers conditional on continued school attendance. 2,537 participants were recruited for the study. The follow-up surveys were conducted in various stages until the participant had graduated from school: 1 year after the intervention, 2 years after the intervention, and 3 year after the intervention. The psychological well-being index was measured using CES-D, Hope Scale, and SRPS.

The monthly cash transfer varied with the recipient: \$10 for the young girls and \$20 for the parent or guardian. The average transfer amount per household was \$540 MER.

- 14. Heath et al. (2020).** This study examines the impact of Mali's *National Cash Transfer Program* on intimate partner violence (IPV) targeting household heads (mostly men) in both polygamous and monogamous households. The cash transfers were accompanied with other health measures, and preventive nutrition packages for children (below 5 years of age) and pregnant women. The key outcomes include IPV and stress levels for men. The stress levels for men were measured using PSS, a standardized stress scale, and Rosenberg's self-esteem instrument.

As implementation costs were not available, we report a rough estimate of average transfer value: \$18.02/month x 36 months = \$649 MER on average from start to endline.

- 15. Baird et al. (2019).** This is a follow-up study to Baird et al. (2013), and examines the long-term impacts of a cash transfer program — unconditional and conditional

cash transfers — on economic and psychological outcomes 4 years after the intervention was rolled out in Malawi.

- 16. Aguilar (2012).** This study examines the medium-term impact of *Progresá*, Mexico's conditional cash transfer program, on the physical and cognitive development of children. The study uses the outcome from a follow-up survey conducted in 2003 with 2,049 households, conducted 5 years after the intervention was rolled out. An index of depressive symptoms was used to measure psychological well-being.

As implementation costs were not available, we report a rough estimate of average transfer value: \$900 MER on average from start to endline.

- 17. Kilburn et al. (2017).** This study examines the impact of the Malawi Government's *Social Cash Transfer Program (SCTP)* on child schooling outcomes with 2,782 households across 29 villages. 1,678 households across 14 villages received unconditional cash transfers and the recipients were encouraged to invest the money in the human capital of their children and basic needs of the households. The program spanned for 2 years and included bi-monthly payments. This study uses the first follow-up survey conducted 1 year after the program was rolled out. PSS was used to measure psychological well-being.

The monthly cash transfer value varied with household size (\$3 - \$7) and composition (\$1 and \$2) per primary and secondary school aged child). The program spanned two years, however this study considers the follow-up survey which was conducted a year after the program started. The average transfer amount per household was \$78 MER.

This study evaluates the same intervention as Angeles et al. (2019).

- 18. Shapiro (2019).** This study examines the impact of cash transfers and development programs (agricultural extension, subsidized agricultural inputs, and poultry transfers). 1,471 low-income Kenyans from 3,008 were randomized to receive cash transfers equivalent to the value of the development programs. Their psychological well-being index consists of the CES-D, GHQ-12, and the happiness and life satisfaction questions from the WVS.

As implementation costs were not available, we report a rough estimate of average transfer value: \$122 MER on average from start to endline.

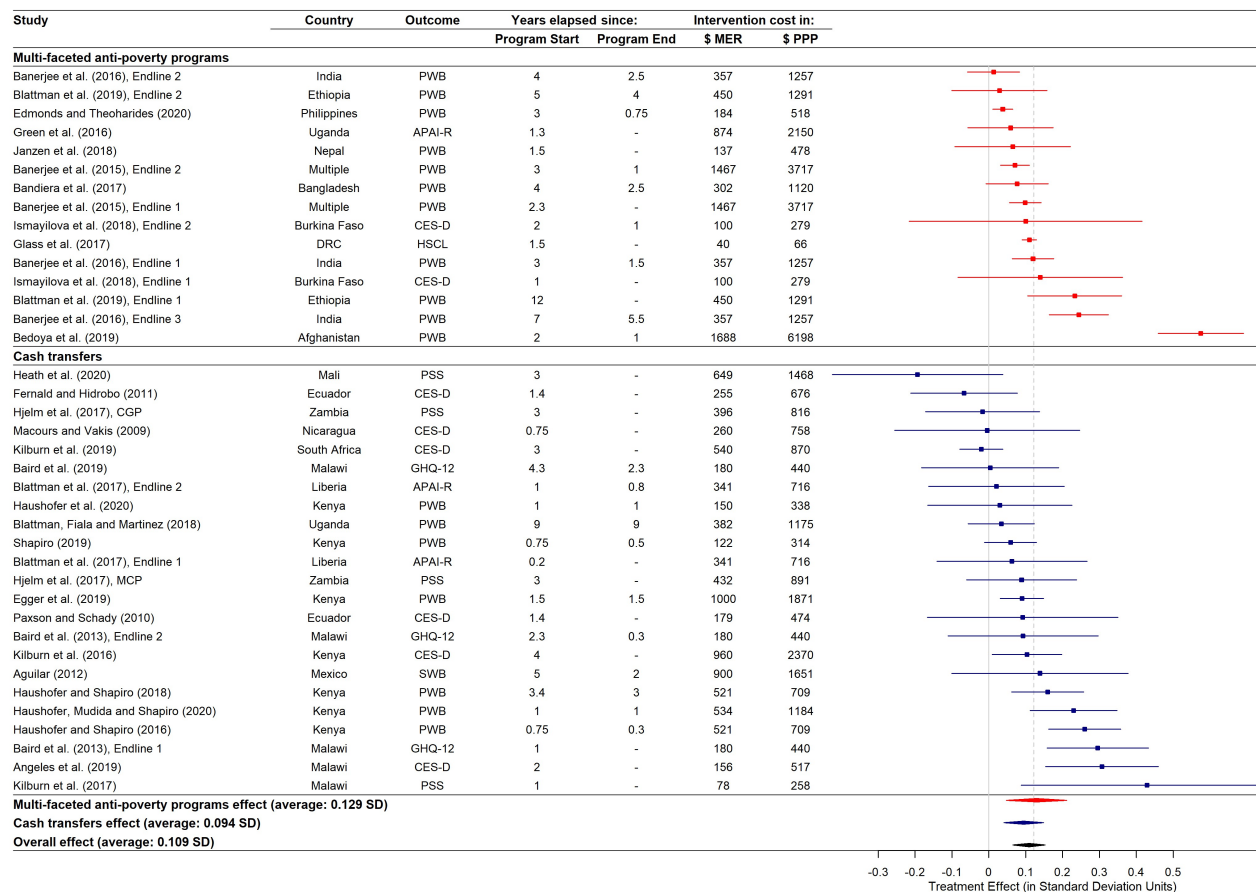
- 19. Macours and Vakis (2009).** This study examines the effect of an Ecuadorian cash transfer program, the *Atención a Crisis*, which provided cash transfers conditional on children's primary school and health service attendance during the program. The program was randomized across six municipalities with 3000 households. CES-D was used to measure psychological well-being.

As implementation costs were not available, we report a rough estimate of average transfer value: \$260 MER on average from start to endline.

**20. Fernald and Hidrobo (2011).** This study examines the effect of a Nicaraguan cash transfer program, the *Bono de Desarrollo Humano (BDH)*, which provided unconditional cash transfers averaging \$15 per month to eligible mothers. The program was randomized across 77 rural and 41 urban parishes (small administrative units), and the authors report results for both rural and urban parishes. The paper also reports effects of *BDH* on mothers' mental health as measured by the CES-D depression scale.

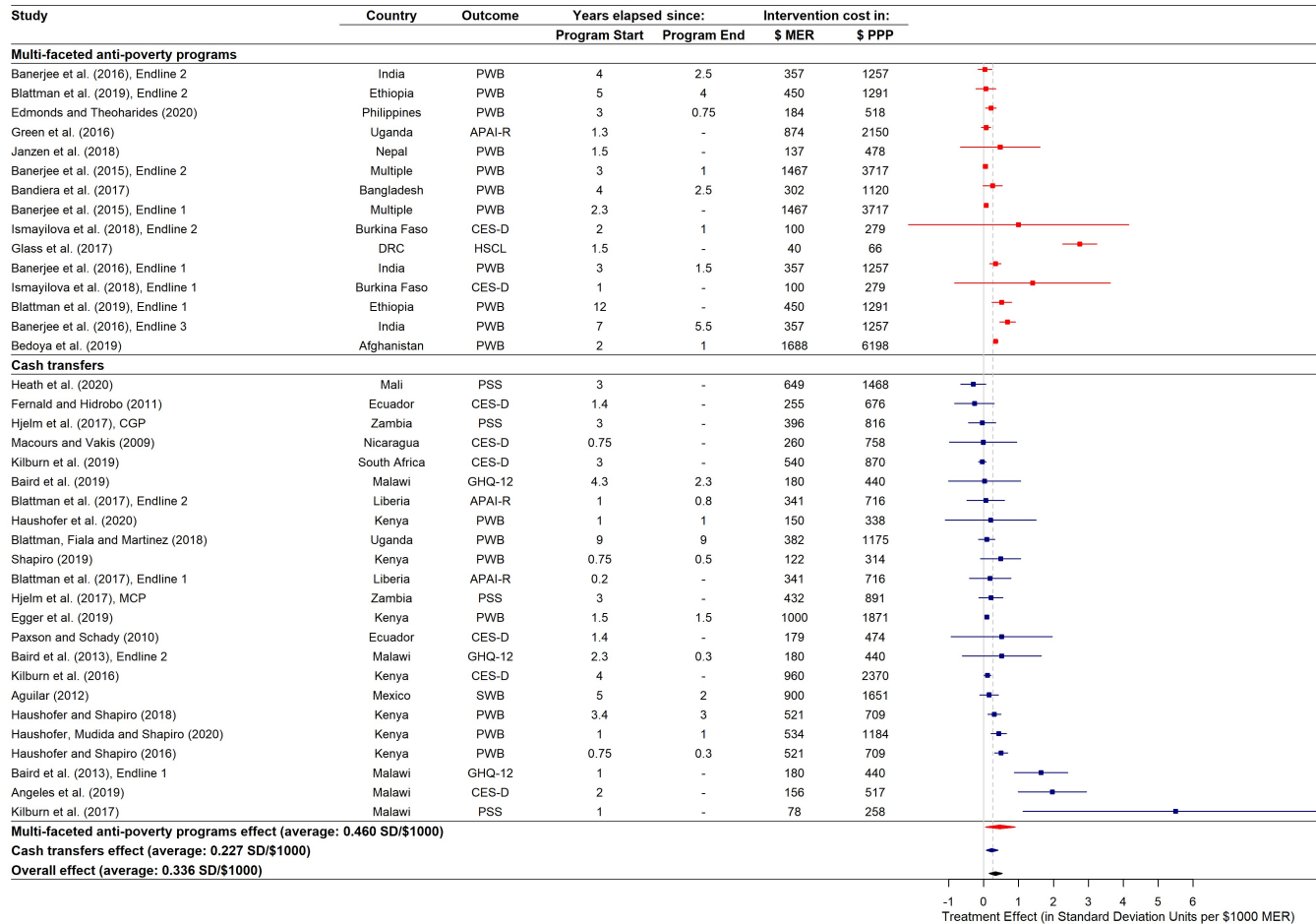
As implementation costs were not available, we report a rough estimate of average transfer value: \$15/month x 17 months = \$255 MER on average from start to endline.

This study evaluates the same intervention as Paxson and Schady (2010). Both studies evaluated the same intervention at the same date; we exclude Paxson and Schady from the main meta-analysis in Figure 4 because they report results from a smaller subsample (rural parishes only).

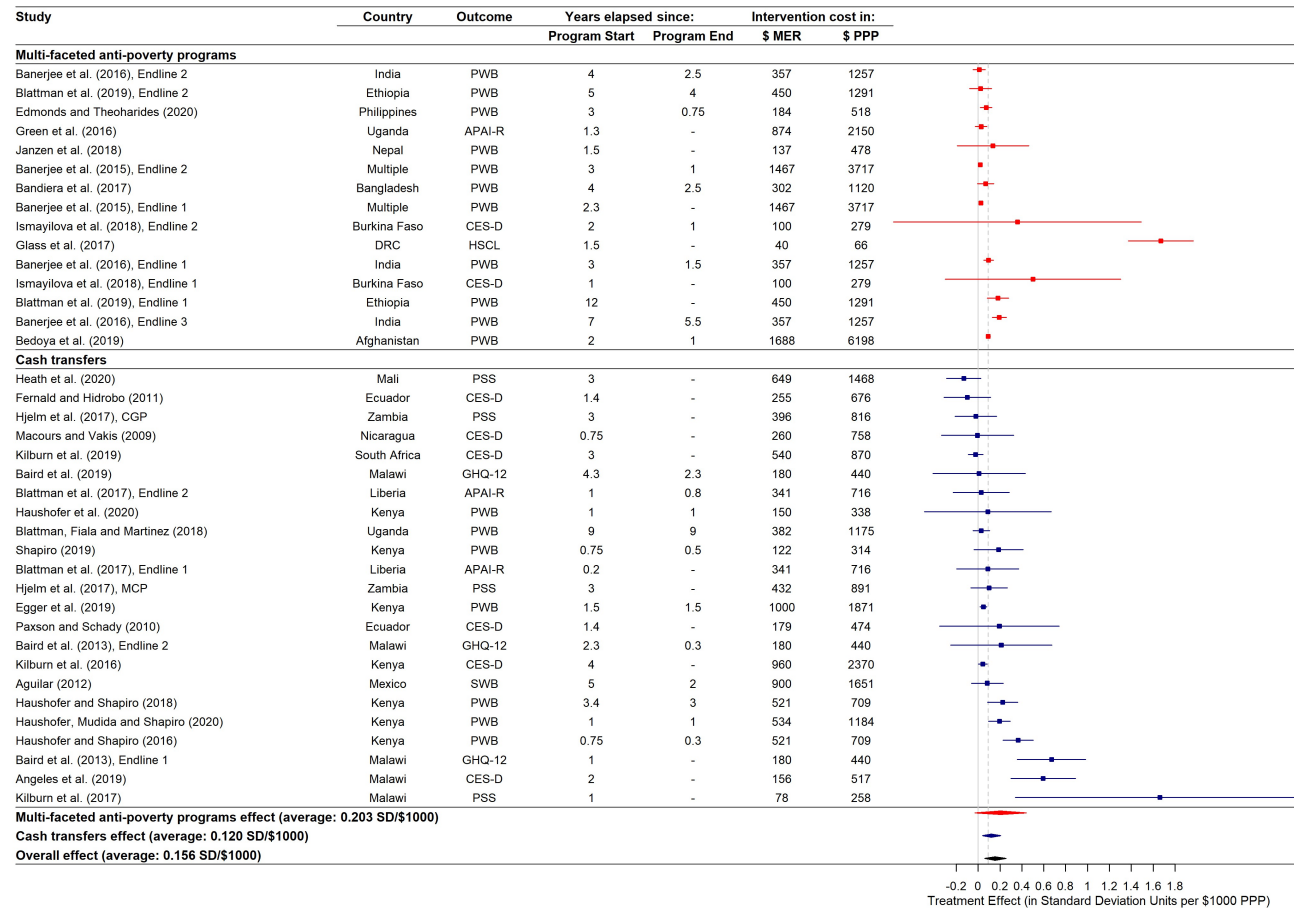


**Fig. S1. The impacts of anti-poverty programs on mental health.**

This is an augmented version of figure 4 which reports results from all follow-up surveys (endlines) and all studies that fit our criteria, rather than reporting only the longest-run treatment effect per intervention as in Figure 4 (40, 163, 164). All terms and abbreviations, etc., used in this figure are the same as in Figure 4.



**Fig. S2: The impacts of anti-poverty programs on mental health, per dollar spent (at market exchange rates)**  
 This is the same as Figure S1 except that the treatment effects are divided by the intervention cost at market exchange rates (MER).



**Fig. S3: The impacts of anti-poverty programs on mental health, per dollar spent (at purchasing power parity).**

This is the same as Figure S1 except that the treatment effects are divided by the intervention cost at purchasing power parity (PPP).

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