The Dynamic Effects of Cash Transfers to Agricultural Households*

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Abstract

Little is known about the evolution and persistence of the effects of one-time cash transfers, especially in rural agricultural settings with limited productive investment opportunities. We use bi-monthly phone surveys to estimate dynamic impacts for cash transfer recipients in Liberia and Malawi. We find immediate increases in food security that attenuate over time but do not entirely dissipate even 1.5-2 years later, driven by increased farm investments and production. We find increases in farm profits, reductions in casual off-farm labor, improvements in psychological well-being, and, in Liberia, a reduction in IPV.

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1 Introduction

While cash transfers will likely increase the contemporaneous consumption of any normal good, evidence on how these effects evolve over time and whether they persist over the long-term is limited. This is particularly relevant for time-limited unconditional cash transfers (UCTs) because realizing sustained and meaningful consumption impacts from temporary infusions of cash necessarily requires making investments in income-generating activities (as opposed to regular transfers, such as a universal basic income or disability payments, which will mechanically increase disposable income in every period). It is not obvious, however, if such productivity-enhancing opportunities exist for the average rural agricultural household in a developing country.

Evidence from prior experiments on the impact of cash transfers on productive investments is mixed. Several studies show sizeable effects on income, at least one to two years post-disbursement, especially when the transfers are targeted around income generation. For example, Blattman et al. (2014) and Blattman et al. (2020) document short- but not long-term effects of cash grants (intended for business investment) that were allocated to groups which had submitted business plans; as do Brudevold-Newman et al. (2024) in the context of cash grants (and business training) among applicants to an entrepreneurship program targeting young women in Nairobi. McIntosh and Zeitlin (2022) document substantial effects over 14 months among underemployed youth in Rwanda. On the other hand, Baird et al. (2024) find that a UCT program designed around business plans increased assets but had no effect on income or consumption in the short or in the long-run in Tanzania. A fairly large literature on cash-drop experiments among existing entrepreneurs shows sizeable effects on both investment and profits,[1] and de Mel et al. (2012) show that these effects persist even 5 years after disbursement.

However, studies with a more representative sample of individuals in various countries

[1] A partial list of papers on this topic include de Mel et al. (2008), McKenzie and Woodruff (2008), Fafchamps et al. (2014), McKenzie (2017), Bernhardt et al. (2019), Hussam et al. (2022), and Crépon et al. (2024).

in sub-Saharan Africa, who live in rural areas where the primary occupation is farming, show more heterogeneous results. Haushofer and Shapiro (2016) show sizeable short-run (9 months) effects on assets, income, and consumption, with the latter two impacts having largely dissipated 3 years after the transfers (Haushofer and Shapiro 2018). Other studies such as Egger et al. (2022) show large gains in assets, but a modest and statistically insignificant effect on income 9-31 months after the first transfer installment. In a multi-armed intervention in Uganda, Sedlmayr et al. (2020) find that respondents receiving cash alone have higher assets but no higher income and consumption relative to a pure control group. There are also a couple of studies that have worked exclusively with farmers: Karlan et al. (2014) find that those in the cash grant arm (average grant amount of $420) invested more in chemical fertilizer but did not increase total farm investment and saw a small, statistically insignificant increase in harvest output; Beaman et al. (2023) provided cash grants of about $140 just before planting in one of their experimental arms. Eighteen months later, grant recipients had increased agricultural investments and saw a larger harvest and higher consumption; however, these effects had petered out by the time of their long-term follow-up (though this occurred quite some time - 7 years - later). Overall, while the evidence is fairly conclusive that large cash transfers cause households to invest in assets, it is less certain whether income and consumption increase, and even if they do, the time path of these effects is entirely unclear. Also note that in many of these studies, the asset outcome spans productive assets as well as durable consumption goods.[2] It is possible, therefore, that the observed increases in assets are largely driven by consumption goods, and if so, that may partly explain why income gains have been short-lived at best.

In this paper, we combine detailed information on productive investments with data on consumption, income and expenditures collected from high-frequency surveys to measure the evolution of effects over time. In particular, we implemented high-frequency phone surveys

[2]For example, in Haushofer and Shapiro (2016), non-land assets include livestock, furniture, agricultural tools, radio, TV, roof, savings, and "other" assets and in Egger et al. (2022), assets are made up of livestock, transportation (bicycles, motorcycles, and cars), electronics, farm tools, furniture, other home goods, and net savings.

that continued until an in-person endline survey, conducted 1.5-2 years after the transfers, to study the persistence and dynamics of large, lump-sum unconditional cash transfers among approximately 6,000 households in rural Liberia and Malawi. In this way, we broaden our understanding of the effect of cash transfers beyond the standard protocol of collecting a single follow-up (or in some cases a small number of follow-ups). Moreover, we are also able to measure the accumulated effects over the period immediately following the transfers, which would naturally be the window during which the response to the transfers would be the largest. A temporally distant endline would tend to miss these effects, underestimating the short-term benefits from cash transfer programs.

The context of our evaluation is heavily agrarian and the respondents are extremely poor: monthly household expenditures in 2019 PPP dollars are only $120 in Liberia and $92 in Malawi,[3] putting these households well below the global poverty line.[4] These households earn their livelihood primarily from agriculture: at baseline, 99% of households in Malawi and 88% in Liberia report engaging in agriculture. While about half the households also report earning supplemental income from other sources, only 20% earn income from non-agricultural self-employment. On average, at baseline, the unconditional value of non-agricultural income in the prior month was only $16.16 PPP in Liberia and $15.28 PPP in Malawi (of this, $9.39 and $5.14 was from self-employment), i.e., around 15% of household consumption. Thus, realizing sustained gains in this context will require either productivity increases in agricultural production, or creation of new businesses.

Since our study set out to measure dynamics, we randomly selected 20% of study households to participate in a bi-monthly phone panel survey. These surveys took about 40

[3]In 2021, the two countries were ranked 222nd and 220th (out of 229) in terms of GDP per capita (CIA's World Factbook).

[4]These consumption numbers are similar to those of the ultra-poor populations studied in recent papers about multi-faceted "graduation" programs such as Bandiera et al. (2017) and Balboni et al. (2021) in Bangladesh ($52 PPP in 2007) or the 6 countries in Banerjee et al. (2015) (average $79 PPP in 2010). These households are also poorer than those in ultra-poor studies in conflict settings such as Afghanistan (assuming a 5 member household) documented by (Bedoya et al. 2019 - $435 PPP in 2015), and Yemen (Brune et al. 2022 - $616 PPP in 2010). One study with substantially poorer households is Angelucci et al. (2023) in the DRC ($25 PPP in 2017).

minutes to complete, and included questions on food security, income, consumption, savings, credit, transfers and related topics. To enable participation, we provided households with phones, and incentivized them to participate in each call. The surveys began as soon as the cash was disbursed, and continued for about 1 year in Liberia and 2 years in Malawi.[5] Compliance with the survey was high, though substantially better in Malawi (which had a more advanced cell phone network at the time): we completed about 88% of surveys in Malawi and 62% in Liberia, and in both countries, compliance was balanced between the treatment and control groups. In addition, we conducted a much longer ($\sim$ 3 hour) in-person endline survey 18-25 months post-disbursement, which included many more questions, as well as modules on outcomes that do not change at a high frequency, such as agriculture, psychological wellbeing, and intimate partner violence. We use these surveys to both measure the persistence of those effects measured in the phone surveys (and corroborate them with a larger sample), as well as to use the additional questions to examine other outcomes.

Using our high-frequency data, we find that in Malawi, food security improves by about 0.5 standard deviations immediately post-transfer, but then diminishes to about 0.2 standard deviations within 6 months. However, the effect size remains at this elevated level for the remainder of our study period, suggesting lasting effects. By the endline, the measured effect size is 0.11 standard deviations. In Liberia, dynamics are less apparent; instead, we observe a steady and persistent effect (of about 0.25 SD), both in the phone surveys and in the endline survey.[6] Yet while we see lasting impacts on food security, this effect is not driven by market transactions: we see a fleeting increase in expenditures, including on large purchases such as durable goods (and this too, in Malawi only), but this effect vanishes within about 6 months, and is therefore, entirely absent at endline. We see no effect on non-agricultural income, savings, or debt at any point, and only modest evidence of effects on interpersonal transfers

[5]Because the disbursement of transfers was slightly delayed in Liberia because of the pandemic (we provide more details below), the phone surveys here ended up starting a little bit before the transfers did.

[6]Incidentally, our effect sizes are fairly similar to those documented in other UCT studies - Haushofer and Shapiro (2016) find a 0.26 SD impact on food security at 9 months and Beaman et al. (2023) find a 0.1 SD effect on their food consumption measure at 18 months.

sent in Liberia.

What accounts for these sustained gains in food security? Our evidence suggests that they are driven by increased agricultural production. In the endline survey, we asked about production decisions for the agricultural season following the transfers, and find evidence of substantial effects on agricultural output: the value of harvest output increased by about 35% in Liberia and 16% in Malawi, and our evidence shows that almost all of this increased output is retained for household consumption in Liberia, and about half is retained in Malawi. In addition, households in both countries report growing a larger number of crops. This increase is driven by investments in both capital and intermediate goods: input purchases go up by about 25% in both countries (although statistically insignificant in Liberia, a context with extremely underdeveloped agricultural input markets) and respondents in the treatment group increased investment in farm tools and in irrigation. There is evidence of more labor being hired on the farm, and this increase is more than 50% of the control mean in Liberia. Taken together, our data suggests that farm profits went up by about 33% in Liberia and by 15% in Malawi. We also find a clear increase in livestock investment of more than 25% in both countries.

On the other hand, we find little evidence of any other kind of productive investments, especially in Malawi, where we find no treatment effects on business capital, income, or investment in education and health. In Liberia, we find an $8 increase in enterprise capital (on a $17 control mean) and a $27 increase in education expenditures (on a $129 control mean). However, effects on non-agricultural income (and enterprise income, specifically) are statistically insignificant.

We use our data to examine several other key outcomes. First, we find that households in both countries reduce their supply of casual labor. The hours reduction is large and significant in Liberia (a reduction of about 7.6 hours over the month prior to the survey, equivalent to about 45% of the control mean) but smaller and insignificant in Malawi. We do not see a subsequent increase in other forms of labor, and so attribute this to an increase in

leisure. However, we also note that there may be some mismeasurement in labor supply; for example, we did not measure hours spent on tending to animals, which may have gone up for the treatment group as they report having larger livestock holdings. Our paper contributes to a large literature that studies the question of whether receipt of cash (via cash transfer programs or as other kinds of welfare payments) may cause beneficiaries to reduce their labor supply, and finds mixed evidence, with most papers finding no effect (see Banerjee et al. 2017 for a review); although recent work by Vivalt et al. (2024) finds that a guaranteed income program in the US states of Illinois and Texas caused respondents to decrease labor hours and spend more time on leisure activities. Similarly, another such program in California caused recipients to reduce part-time (but not full-time) work (Balakrishnan et al. 2024). Our result is also generally consistent with Fink et al. (2020), who find that access to credit decreases casual labor off the farm (though increases labor on the farm, in contrast to our result).[7]

We also examine a few non-economic outcomes, such as intimate partner violence (IPV) and psychological well-being. In theory, cash transfers could impact IPV in either direction. By raising household economic well-being, cash transfers might reduce conflict (Ellsberg et al. 2015); on the other hand, a sub-literature on women's economic empowerment suggests that interventions that improve women's financial status (cash transfers would be one of these) could increase IPV due to shifts in power dynamics, for example, as backlash (Buller et al. 2018; Chin 2012) or as a method for male partners to gain control over resources (Bobonis et al. 2013). Several papers have analyzed this question empirically, and by now, there is an emerging consensus that cash transfers generally lead to a decrease in IPV (Haushofer and Shapiro 2016; Hidrobo et al. 2016; Baranov et al. 2021; Heath et al. 2020), though this is not always the case. In fact, we find that IPV is affected only in Liberia but not Malawi. One reason for this is that the contexts are quite different. Liberia has a recent history of civil conflict in which violence against women was widely used as a weapon of war, and baseline IPV rates are extremely high: 38% of the control group report IPV over the past

[7]It is also related to Aggarwal et al. (2023) who find that savings accounts (in the form of lockboxes or mobile money) reduce labor supply in business and increase agricultural labor.

year. Malawi has a much lower prevalence of 18%. We find a large, statistically significant decline of about 8 percentage points in Liberia, but no effect in Malawi. Consistent with the prior literature, we find improvements in psychological well-being in both countries.

Finally, the contrast in some of the findings from the high-frequency phone surveys relative to those from the endline survey contributes to our understanding of experiment design. Summing up the data from our phone surveys and an in-person endline, we find that over the 2 years starting from initial disbursement, the transfers generated cumulative impacts of 3.5-4 monthly standard deviations in food security in the 2 countries (relative to 0.29 and 0.11 standard deviations at endline). In Liberia, we find an imprecise point estimate on cumulative non-durable expenditures of $108 PPP and a statistically significant increase of $245 in non-monetary assets, which accounts for approximately 10% and 22% of the cash transfer. In Malawi, we find much larger impacts on non-durable expenditures ($680 PPP, 50% of the transfer) and assets ($359 PPP, 26% of the transfer). Of the total non-durable expenditures, the endline accounts for only $15 and $2 in Liberia and Malawi respectively. This evolution of effects over a relatively short period of just 2 years suggests that *when* effects are measured may directly impact how large they are, especially for interventions that may have "front-loaded" effects, such as large UCTs. While effects on lasting investments such as assets could have been measured in a single endline, the vast majority of the impacts on food security and non-durable expenditures would be missed with less frequent data collection.

2 Experimental Design

2.1 Experimental context and design

The NGO GiveDirectly (henceforth, GD) implemented a cash transfer program in 300 villages in both Liberia and Malawi in 2019-2021 (600 villages total), with the sample split equally between treatment and control. Targeted counties and districts were identified by GD and the funding partner, USAID, based on poverty levels, mobile phone coverage, and proximity

to roads. Villages were eligible if their population (as of the most recent population census), was below a threshold size (100 households in Malawi and 125 in Liberia).[8] Households were identified in collaboration with GD, who visited every village (both treatment and control) in the sampling frame and recorded every habitation structure with a GPS pin. Even though the households in our study sample are specifically selected on the criterion of being inhabitants of "small" villages, they look very similar to the average rural household in the study region.[9]

Amongst the 600 villages, we randomized treatment, stratifying by country and by administrative unit (district in Liberia, traditional authority in Malawi). Treatment villages were randomized into one of three *nominal* amounts: $250 ($555 PPP in Liberia; $678 PPP in Malawi), $500 ($1,100; $1,355 PPP) or $750 ($1,665; $2,033 PPP).[10] Targeting was universal: in treatment villages, every household received the transfer. For logistical reasons, transfers were disbursed in 1-3 tranches. GD capped disbursements at $250 per tranche, making additional tranches in the following months; they did this to smooth the amount of money being sent out in a given month. Thus, respondents who received $250 received their transfer in a single transfer; while those receiving $500 or $750 received 2 or 3 transfers, respectively. These were given out over consecutive months in Liberia, and every other month in Malawi, i.e., transfers were fully given out over 1-3 months in Liberia and over 1-5 months in Malawi (depending on the amount).[11]

In addition, in Malawi, we cross-randomized an "input fair" intervention which was designed to reduce transport costs to invest in agricultural inputs. We coordinated with

[8]Since the transfers were universal, GD targeted smaller villages in order to cover enough villages while staying within its budget.

[9]See Appendix Table S4 in Aggarwal et al. (2022b) for a comparison between the characteristics of the study households and that of representative households from large scale surveys done by the World Bank - the HIES 2016 for Liberia and the IHS 2019 for Malawi.

[10]Values for USD purchasing power parity (PPP) are calculated based on the PPP conversion factor at baseline (2018 for Liberia and 2019 for Malawi).

[11]Within each treatment village in Liberia, transfers were also randomized between being paid either in this "lump-sum" manner, or via quarterly payments spread out over a year (this design is similar to one of the treatment conditions in Haushofer and Shapiro 2016). This randomization was done within, rather than across, villages. Because this payment modality was done only in Liberia, we remove these households from our analysis in this paper. Please see the prior version of this paper (Aggarwal et al. 2022a) for a discussion of those results.

a local agricultural retailer to offer inputs for sale on predesignated days at locations near farmers' homes (usually in schools), and marketed these as input fairs. We subsidized the cost for farmers to attend these events. At one of our partners' request, the input fair was only offered in a third of villages: ultimately, 100 villages received cash only, 50 received market access only, 50 received both, and 100 served as control. Because the input fair was designed solely around agricultural investment, it is unlikely to have major effects beyond that channel. In this analysis, we therefore control for the input fair treatment, and its interaction with cash, but do not report results for the input fair treatment itself.

Within each household, the transfer was made to a beneficiary chosen by the household. As the household beneficiary had to be home at the time of enrollment, the majority of beneficiaries were women. Since beneficiary selection was endogenous and because the mechanics of how the transfer was shared within the household are unknown to us, the household is our unit of analysis. That said, as we will explain in greater detail below in Section 2.2, the vast majority of our survey respondents are women.

In Liberia, the project was implemented in two waves: a smaller "Wave 1" with 90 villages, in which transfers were disbursed from March 2019 to February 2020; and a larger "Wave 2" with 210 villages, in which transfers were disbursed from March 2020 to July 2021. In Malawi, all 300 villages were enrolled in a single wave (though enrollment was protracted) and transfers were disbursed from July 2019 to February 2020. As village enrollment took several months, the start date of transfers varied across villages (but not across households within a village). We estimate all results relative to the start date in that specific village (while controlling for month fixed effects).

In both countries, transfers were disbursed via mobile money. Households could enroll using a phone they already owned or purchase a cell phone with a mobile-money-enabled SIM during enrollment from GD. GD estimates that the vast majority of households exercised the option of buying a new phone. We know anecdotally that households did not hold the GD transfers as balance in their mobile money accounts, and instead cashed-out shortly after

receipt.[12] It is noteworthy that the average household reported spending 3% of the total transfer received on mobile money withdrawal fees and 1% on transport for the withdrawal.

Some of the fieldwork overlapped with COVID-19 lockdowns, particularly in Liberia. As a result, our in-person data collection and GD's enrollment activities had to be paused in 2020, and the Wave 2 transfers in Liberia were consequently delayed. In Malawi, enrollment ended just before the pandemic started, and in-person data collection even before that. Phone surveys went on as planned throughout the lockdown. However, it is possible that the effects we observe were affected by the general economic environment in the COVID and immediate post-COVID period. For more detail on the dynamics of food security and other outcomes during this time period, please see Aggarwal et al. (2022b) which uses the phone surveys to track outcomes pre- and post-COVID.

2.2 Data

To construct the sample, we randomly sampled 10 GPS pins from the census list that GD collected and conducted baseline surveys with those households (6,000 households across both countries). These surveys took place in November-December 2018 for Liberia Wave 1, November-December 2019 for Liberia Wave 2, and April-July 2019 for Malawi. The surveys took about 2-3 hours to administer, and included questions on demographics, agriculture (measuring outcomes for the season immediately before cash was disbursed), cash flows, food security, mobile money usage, shocks and resilience, and IPV (among other subjects). Since IPV is a primary outcome, surveys targeted female heads of (dual-headed) households.[13] While we attempted to survey 3,000 households in each country (10 per village), we were only able to enroll fewer than this in some small villages which had less than 10 households total, leading to a final sample of 2,715 in Liberia and 2,944 in Malawi.

Two of the 10 households from every village were further sampled to answer a monthly

[12] In surveys conducted in Malawi shortly after receipt, the treatment group reported having cashed out 92% of the transfer. The actual cash-out rate may be even higher if respondents were hesitant to report holding large amounts of cash on hand.

[13] Male heads were interviewed only when the female was absent and unreachable.

phone survey designed to measure a pre-defined set of outcomes. Each respondent sampled for this activity received a phone (worth $10-15). Of these 2, we called one household per village in even-numbered months, and the other in odd-numbered months. This results in a monthly village-level panel and a bi-monthly household-level panel. The surveys included questions on food security, expenditures, income, labor supply, transfers, savings, and credit.[14] The phone surveys were administered from July 2019 to August 2021 in Malawi, from February 2019 to September 2020 for Liberia Wave 1, and from January 2020 to October 2021 for Liberia Wave 2. The responses to this panel survey form our high-frequency data which we use to study dynamics.

We collected a fuller set of outcomes from the entire sample via in-person endline surveys, which were conducted in late 2020 for Liberia Wave 1 (18-20 months after disbursement), late 2021 for Liberia Wave 2 (18-22 months after disbursement) and April-July 2021 in Malawi (21-25 months after disbursement). These surveys were similar to the baselines in length and scope.[15] Figure A1 provides a timeline of project-related activities.

As shown in Table A1, there was little attrition from the endline survey in either country (96% of households completed the endline in Liberia, and 94% in Malawi), and attrition was balanced between treatment and control. Attrition in the phone survey, shown in Table A2, is more heterogeneous across countries. In Malawi (Panel A), over 95% of the sample participated in early rounds; though this percentage fell over time, we still successfully interviewed 80% or more until the 12th round (approximately 2 years after cash was disbursed). However, in Liberia, attrition is substantially higher, largely due to the country's inferior phone network. Also, in Wave 1, we noticed that households in the treatment group were more likely to switch to the SIM card provided by GD, thus making it more difficult to reach these respondents. We, therefore, drop Liberia Wave 1 from the phone survey analysis. In Wave 2, we took proactive steps to avoid this problem and managed to achieve a balanced sample,

[14] During COVID-19 lockdowns, we added questions aimed at measuring their impact. Aggarwal et al. (2022b) documents the impact of COVID in these two countries.

[15] See Jeong et al. (2023) and Park et al. (2024) for analyses of cross-randomized survey experiments on survey length and interview modality of IPV, respectively, in these baseline and endline surveys.

but the overall level of attrition is still substantially higher than Malawi: survey completion peaks at 72%, but falls below 60% by the 7th round (14 months after cash disbursement).[16]

2.3 Summary statistics and randomization check

Table 1 presents summary statistics and a randomization balance check. Columns 1 and 4 show the means and standard deviations of the control group in Liberia and Malawi, respectively. Columns 2 and 5 show the p-values for a t-test of equality between treatment and control, and Columns 3 and 6 report the p-values for an F-test of equality of means across the 3 sub-treatments ($250, $500, $750) and control. The underlying regressions control for strata fixed effects and cluster standard errors by village.

Because we targeted women for surveys, the sample skews female: 77% of the sample in Liberia and 94% in Malawi are women. Eighty-five percent are married in Liberia, and 67% in Malawi. The average age (about 40 years) is similar in the 2 countries. Education levels are low, averaging 2.9 years in Liberia and 4.7 years in Malawi. On average, households have nearly 5 members. There are no statistically significant differences across experimental arms.

Panel A also includes a few measures relevant to the context. In prior evaluations with GD, the presence of a thatched roof was a targeting criteria, but only a minority in Liberia (23%) and about half in Malawi have a thatch roof (despite, as we will see, the high level of poverty).[17] In terms of occupation, 88% of households in Liberia and 99% in Malawi earn income from farming while about half earn any non-agricultural income. A little less than a quarter own a business.

Panel B shows baseline measures of some important primary outcomes: a food security

[16] We examine correlates of attrition in Table A3, in which we regress the percentage of rounds completed on various covariates. We find a few common predictors: in general, older and richer respondents are more likely to complete surveys, likely reflective of better cell phone network coverage (or perhaps access to power) or that older respondents may be more likely to be at home for the calls. We replicate our main results using only those respondents who completed every round, though the sample size is dramatically reduced (results on request).

[17] Liberia is exceptionally rainy, so metal roofs are the norm, even among the poor. In the Liberia DHS 2019-2020, 82% of households had a roof made of zinc, metal, or aluminum.

index (FSI),[18] expenditures, assets, and income (all values in 2019 PPP dollars). Overall, total monthly expenditures in the control group are $51 in Liberia and $39 in Malawi, with food expenditures being about 42% of the total in each country. The total value of durables, livestock, and financial assets is approximately $250 in both countries. Total non-agricultural incomes ($16) are also fairly similar in both contexts. Again, we observe sample balance on each of these attributes across treatment and control, other than in the case of the FSI over the disaggregated treatment arms. Overall, randomization appears successful; in any case, all regressions were pre-specified as ANCOVA and we control for baseline measures throughout the paper.

3 Results

3.1 Dynamic treatment effects

We estimate time-varying treatment effects using the phone survey data as follows:

$$Y_{ivst} = \sum_t \beta_t Cash_{vs} D_{tvs} + \gamma Y_{ivs0} + \delta I_{vs} + \eta I_{vs} * Cash_{vs} + \phi_m + \lambda_s + \varepsilon_{ivst} \quad (1)$$

where Y_{ivst} is an outcome for individual i in village v and strata s at time t, which is defined as the number of months since cash transfers began (defined for each stratum, and thus, able to take on values for both treatment and control). $Cash_{vs}$ is a binary variable equal to 1 for villages assigned to any cash transfer, 0 otherwise; D_{tvs} is a binary variable equal to 1 for a survey that occurred t months since transfers began; Y_{ivs0} is the baseline value of the outcome variable; I_{vs} is an indicator for the input fair treatment (in Malawi only); and ϕ_m and λ_s are calendar month and strata fixed effects, respectively. We cluster standard errors

[18] The FSI is comprised of standardized scores of the Household Dietary Diversity Score (HDDS), measured over the past 24 hours, the Food Consumption Score (FCS), measured over the past 7 days, and the Household Hunger Scale (HHS), measured over the past month. The baseline and endline FSI also includes a fourth measure, the Food Insecurity Experience Scale (FIES), which we didn't measure in the phone surveys because it has a one-year recall. A z-score is calculated using inverse covariance weighting (Anderson 2008).

by village, the level of randomization.

Figure 1 plots the coefficient and confidence intervals from Equation (1) for four important outcomes: food security, non-durable expenditures, large purchases, and non-agricultural income. The figures pool two months together so that the comparison across points in the graph is for the same set of respondents. In Malawi, we observe a spike in food security, expenditures, and large purchases immediately after disbursement, but no effect on non-agricultural income. For these 3 outcomes, we also observe clear evidence of time-varying treatment effects. Specifically, food security increased by over 0.5 standard deviations in the first six months (statistically significant at 1%) but then fell to approximately 0.25 standard deviations by the 8th month. These levels persist for the duration of the survey period (24-26 months after the initial transfer).[19] For non-durable expenditures and large purchases, treatment effects are substantial initially, but then fall to being indistinguishable from zero within 10-12 months. The result that large purchases increase for about 8 months indicates that these larger outlays were not all spent immediately post-disbursement but spread out over some period of time. Non-agricultural income shows little effect throughout.

The picture is slightly different for Liberia. While there is also a clear increase in food security immediately post-transfer, the magnitude is smaller (0.25-0.4 standard deviations), and the effect persists for the duration of surveying.[20] The effect on non-durable expenditure is fairly modest relative to Malawi (and to the total transfer size) and indistinguishable from zero. There is also no strong evidence of an effects on non-agricultural income, though the results are noisier than in Malawi.

Figure 2 shows effects on other outcomes measured in the phone surveys, specifically savings, debt, and inter-personal transfers. We report savings as a stock variable, measured as the total balance held by the household at the time of the survey, and it is remarkable for

[19] Figure A4 shows food security results by each of the components of the index (HDDS, FCS, and HHS), and shows that the time path is similar for each.

[20] Figure 1 suggests that food security outcomes in the treatment group improved in the round *before* the first payment. Although not statistically significant, it is possible that effects manifest before the recorded date because of measurement error in the date of the first GD transfer, or because treatment households could have started spending in anticipation.

its low baseline value: the average control household reports holding only $5-$23 in savings over this period in Liberia, and $12-$24 in Malawi. We see minimal treatment effects on reported savings, as well as on outstanding debt on the date of each survey round. The lack of effects suggests that the vast majority of income is spent, rather than used to build savings or discharge debt, and suggests a marginal propensity to consume close to 1. In regards to transfers, we see small but positive point estimates on transfers sent in Liberia (of a few dollars per month) and no effect whatsoever on those received. In Malawi, we observe no effect on either at any point in time. These results suggest that little or none of the cash transfer amount is directly shared with others (which may be because the transfers were targeted universally within villages and so, unlike studies such as Angelucci and De Giorgi (2009), there is little scope for sharing, at least within village networks.

Finally, in Figure 3 we show results separately by the different grant sizes ($250, $500, or $750), for the main outcomes shown in Figure 2. We perform this analysis in Malawi only, because that is the country in which we observe the more interesting dynamics. We can clearly see here that effects on food security and expenditures are larger and last longer if transfers are larger. The overall pattern is similar across the different grant amounts, however, suggesting that the qualitative type of investment choices is similar across the grant amounts.

3.2 Cumulative effects over study period

For the phone survey sample, we calculate cumulative effects, by summing the "flow" variables shown in the prior figure, and add in data collected on stocks at endline (18-24 months post-transfer). Having created these cumulative variables, we run the following regressions:

$$Y_{ivs} = \beta Cash_{vs} + \gamma Y_{ivs0} + \delta I_{vs} + \eta I_{vs} * Cash_{vs} + \lambda_s + \varepsilon_{ivs} \tag{2}$$

where Y_{ivs} is either the cumulative value of the flow value, or the measured endline stock. Standard errors are clustered by village. For each outcome, we show results from two separate regressions: one with all cash treatments pooled, and a second with treatment effects

disaggregated by grant size. For the latter, we report p-values from a test for the linearity of the effect size in the dollar value of the cash amount, as well as from a test for equality of the three effect sizes.

Results are shown in Table 2. Columns 1-5 show effects on flow variables aggregated over the sample period (including all the phone surveys as well as the endline).[21] Column 1 shows the cumulative effect on (standard deviations of) monthly food security. Over the sample period, we find an increase of 3.5 cumulative standard deviations in Liberia and 4 in Malawi. Column 2 shows "non-durable" expenditures, which we define as all expenditures excluding investments in assets (durable goods, housing, land business assets, livestock, and agricultural assets). This category of expenditures was measured in the phone surveys, as well as in the endline. In Liberia, we find an increase of $108 PPP (insignificant) and $680 in Malawi (significant). This is equivalent to about 10% and 50% of the average transfer amount in Liberia ($1,100 PPP) and Malawi ($1,355 PPP) respectively. Column 3 shows cumulative non-agricultural income, which shows a small, statistically insignificant effect in both countries (and is in fact negative in Malawi). Columns 4-5 show interpersonal transfers received and sent. In Liberia, we observe positive coefficients for both transfers sent and received, whereas in Malawi the coefficient on transfers out is positive but that on transfers in is negative. None of these coefficients are significant, though several are close to significance at 10%.

Columns 6-7 show asset stocks as measured in the endline (for the entire sample, not just the phone survey sample). The difference between the endline stock of assets of the treatment and control groups can be thought of as the expenditure on durable assets by those who received the transfers over the entire course of the sample period. Column 6 shows non-monetary assets including durable goods, business and farming assets, livestock, housing, and land. Consistent with prior work, we see large, statistically significant effects in both countries: the coefficient is $245 PPP in Liberia and $360 in Malawi. Column 7 show net

[21] Each household was surveyed every two months, and for the months when no survey took place, the values were interpolated.

financial savings (financial savings less debt), and shows a statistically insignificant increase of $25 PPP in Liberia and only $8.5 in Malawi. The increase in savings is large relative to control net savings balances of only $35 in Liberia and a negative net savings balance in Malawi, but in both countries, it is a small percentage of the overall transfer amount.[22]

The bottom of the table shows tests for whether effects are linear in the grant amount, as well as those for equality of coefficients. Since our overall phone survey sample is fairly small in Liberia, which gets further split across multiple transfer amounts, we cannot reject either of the two hypotheses (linearity and equality). In Malawi, we reject it only for non-agricultural income, although we do observe larger point estimates for larger grant sizes for food security and savings, but ultimately cannot reject equality. We reject linearity for several outcomes: large purchases, interpersonal transfers sent, and at 10% for total expenditures in Liberia; also at 10% for non-agricultural income, savings balance, and debt amount in Malawi. Some of these exceptions provide some suggestive evidence that effects may be longer-lasting for larger transfers: in Liberia, total expenditures are insignificantly different from zero for $250 but not the other two amount sizes, while in Malawi savings are increased for the $750 treatment, but not the smaller ones. However, due to power issues, these results are more suggestive than definitive.

3.3 Effects at endline

We now turn to using the endline to look at effects on some of our main outcomes at 18-24 months from when the transfers were first disbursed. This analysis is similar to those in prior evaluations of cash transfers, giving a snapshot of these variables at a single point in time, allowing for benchmarking with the remainder of the literature on UCTs. For this analysis, we are able to use the entire study sample, and not just the 20% with whom we ran the phone surveys. However, in this analysis, all the flow variables (such as expenditures and

[22] This is also in line with other work, such as Sedlmayr et al. (2020) who find that only about 1,500 UGX out of a transfer of nearly 300,000 UGX was saved and Haushofer and Shapiro (2016) who report an increase in savings of about $10 out of a $700 transfer.

income) are only measured over the period immediately preceding the endline survey.

Table 3 shows effects for the 5 outcomes shown in Columns 1-5 of Table 2. In the first row of each panel, we start by showing effects pooled across the different amounts. We continue to see significant improvements in food security, even this long after the transfers were disbursed: households in treated villages reported a 0.29 and 0.11 standard deviations improvement in the Food Security Index (FSI) in Liberia and Malawi respectively, both statistically significant. We also observe an increase in non-durable expenditures in Liberia, and the effect is sizeable: a $15 increase on a $143 base. However, we find no such effect in Malawi.[23]

If we had relied solely on the endline to estimate treatment effects, we would have confirmed the existence of several lasting effects, such as on food security, but we see that we would have captured only a small fraction of the overall treatment effect. For example, while we observe a 0.11-0.29 SD effect on food security at this point, the results in Table 2 are larger by an order of magnitude. Thus, our results also point to the importance of measurement timing as an important consideration of experimental design, especially when outcomes may be dynamic in nature.

3.4 Mechanisms

Agricultural Investment

An important finding to emerge out of Figure 1 and Table 3 is that while there are persistent increases in food security (present even at the endline), they are accompanied neither by an increase in expenditures, nor by any in non-agricultural income. What then explains these persistent effects?

Since this is a heavily agrarian context, any potential investment and income increases driving persistent effects on food security would most likely be driven by agriculture. Therefore,

[23] As above, the bottom of the table shows tests for whether effects are linear in the grant amount, as well as those for equality of coefficients. In Liberia, we reject equality for 2 coefficients: food security and non-durable expenditures. In Malawi, we reject it only for non-agricultural income.

we next examine farm production decisions in the wake of receiving the transfers.

We start by analyzing the output side. Table 4 shows effects on agriculture, covering one full agricultural season after transfers were disbursed. In Column 1, we start by showing that indeed there was a large increase in the value of harvest (aggregated over all crops, and using average prices as reported in our survey data). We find an increase of $311 in harvest value in Liberia (a 35% increase, on a base of $894) and an increase of $101 in Malawi (a 16% increase, on a base of $613). It is thus possible that persistent food security increases are driven by increased home production. Indeed, the evidence partly bears this out: in Column 2, we see that transfer recipients in Liberia report selling only $20 worth of output, i.e., just over 5% of the increased output was sold (suggesting that the remainder was consumed at home), and in Malawi, about 50% of the increased output was sold.

The next few columns report effects on crop and input choices that may be driving the increase in output. Column 3 shows crop choice. We find that beneficiaries grow more crops in both countries: 0.34 more crops in Liberia and 0.15 more in Malawi, on a base of about 2 crops in both countries. Columns 4-6 show investment in physical and human capital for crop agriculture, specifically, inputs such as fertilizer, seeds and pesticides (Column 4), hired labor (Column 5), and investments in farm tools and irrigation at endline (Column 6). We find that these treatment effects are positive across the board, and also statistically significant in the case of tools and irrigation in both countries, labor in Liberia,[24] and inputs in Malawi. The effect on fertilizer, seeds and pesticides represents a 25% increase, despite relatively high baseline input usage ($52) due to the country's FISP program. We use the dollar values of the farm input investments reported in Columns 4-6, and subtract them from the harvest values reported in Column 1, to impute farm profits.[25] We report the coefficients from a regression of these imputed profits on treatment in Column 7 (note, however, that these profits are not net of own and family labor as we did not measure those for the agricultural

[24] We measured retrospective information on labor inputs during different phases of the agricultural season in the endline.

[25] To do so, we assume that capital goods, i.e., tools and irrigation facilities would depreciate over 5 years, and therefore, consider only 20% of the value reported by the household to compute annual profits.

season). We find that farm profits for the agricultural season immediately following the transfers go up by USD 263 PPP in Liberia and by USD 78 PPP in Malawi. These numbers suggest a significant return on transfer dollars, especially in Liberia, where the increase in farm profits alone is worth 24% of the average transfer amount (USD 1100 PPP). In Malawi, farm profit increase is about 6% of the transfer amount. It is worth emphasizing however, that these profits correspond to just one agricultural season, whereas the farm investmens made by the households, especially those in tools and irrigation, would likely generate returns in subsequent years as well. Finally, we examine if treatment households also changed their area under cultivation. Column 8 shows land under cultivation and shows no effect.[26]

In each panel, we also show disaggregated results by transfer amount. We cannot reject equality of the effects on harvest quantities, sales, or profits. While the pattern of coefficients suggests that those receiving the larger transfers may have been able to make slightly larger farm investments, even for these, we cannot reject equality of coefficients other than in the case of input purchases in Malawi. Finally, for all statistically significant outcomes, we cannot reject that effects are linear in grant size.

Non-crop agriculture, enterprise, and other investment

Table 5 shows results on physical and human capital investments outside of crop agriculture to identify other sources of persistent gains. We start by showing effects on the stock of livestock owned by the study households at endline (Column 1). In both countries, the treatment group reports about a 25% increase in the value of livestock owned. Livestock products may also partly explain the increases in food security experienced by the treatment households. The increase in livestock holdings is a particularly noteworthy finding in that livestock transfers have been a central element of the multifaceted 'graduation' (out-of-poverty) programs that

[26] In Table A5, we examine whether the increase in output is generally commensurate with increases in inputs. In particular, we regress, for the control group only, the value of harvest (as measured in the endline survey) on the various measures of agricultural investment described in Table 4, plus livestock (which we show in Table 5 due to a paucity of space). The measured changes in inputs and investments explain about 75% of the observed output increase in Liberia and 71% in Malawi. However, note that the R-squared of this cross-sectional correlation is on the low side.

were tried out in many countries.[27] Our results suggest that similar outcomes may be attainable just by giving households cash alone, which can be delivered at a fraction of the cost of graduation programs which require costly administration. Moreover, UCTs enable households to also make other complementary investments (such as in agriculture in this case), whose possibility is precluded by in-kind transfers.

Consistent with the prior literature, Column 2 shows sizeable increases in investment in housing and durable goods of ($197) 24% in Liberia and $324 (20%) in Malawi. Since these are PPP amounts, this translates to 18% of the transfer in Liberia and 24% in Malawi.[28] Next, in Columns 3 and 4, show spending on education and health. In Liberia, we see an increase in education spending ($27, base $129) but no effect in Malawi (on a base only half as large). We attribute this to the fact that primary school is free in Malawi but not in Liberia, and thus is an important investment channel in Liberia. We see no effect on health expenditures in either country.

Finally, we examine enterprise outcomes. Columns 5-7 display enterprise starts, investment and income, and show some evidence of an increase in enterprise activity in Liberia: the probability of starting an enterprise increases by 3 percentage points (significant at 10%), on a base of only 8%, and the value of business capital increases by $8 on a base of $17 (also significant at 10%). Enterprise income also increases by about 50% (on a very low base), but is not statistically significant. In Malawi, on the other hand, we find no evidence of any entrepreneurial activity in response to receiving cash (in fact point estimates are negative).[29]

Turning to disaggregated effects by grant size, what jumps out is the fact that the "large" (both $500 and $750) grant recipients made similar and large outlays on housing and durables

[27] See Balboni et al. (2021) and Banerjee et al. (2021) for evidence on the long-term effectiveness of these programs in Bangladesh and India respectively.

[28] Note that these are just a subset of the non-monetary assets already shown in Table 2, but we show them here for the sake of completeness.

[29] A possible reason for the modest effects on enterprise income is that effects may be larger for those that already own a business (as in Banerjee et al. 2024), but only a minority of people in our samples have a business at baseline (21-23% of our sample). To investigate this, we examine heterogeneity in impacts by whether the respondent has a business at baseline in Table A6. However, we do not observe effects for existing entrepreneurs in either country (in fact, in Malawi the point estimate is actually negative, though only significant at 10%.)

(coefficients are between 270 and 290 in Liberia and between 400 and 490 in Malawi), but we observe virtually no effects for the $250 grant size; however, we only reject equality in Malawi. We observe a similar pattern for education expenses in Liberia and for livestock in Malawi, and here too, we reject equality in both cases. We reject linearity for only one outcome (the value of self-owned capital in Liberia), which shows a puzzling pattern that effects are actually decreasing in grant size and we formally reject linearity. One possible explanation for this is that, as discussed, we do not see a statistically significant increase in housing and durable wealth in the $250 arm, in either country, and perhaps some of this investment was put into the business in Liberia.

In Table A7, we examine whether these education investments that we observe in Table 5 translate into schooling outcomes. In Liberia, only 48% of primary-age children are enrolled in school (compared to 93% in Malawi), and we see a 10 percentage point enrollment increase due to cash. We also see negative point estimates on days of school missed in the past year (total and due specifically to lack of money) in both countries, as well as an increase in the proportion of days attended in the past week. Interestingly, in Malawi we also see positive effects on school attendance.

3.5 Other results

In this subsection, we discuss a few other key results. For an exhausting list of the outcomes pre-specified in our pre-analysis plan, please see the older version of this paper Aggarwal et al. (2022a).

Labor Supply

The effect of transfers on labor supply is an important question in regards to cash transfers generally, but also in this context of agricultural households in which households may choose between supplying labor in multiple occupations, and cash may affect this choice in various ways. For example, Fink et al. (2020) show that credit reduces casual labor in favor of

on-farm labor, and Aggarwal et al. (2023), where savings accounts given to entrepreneurs reduce labor supply in the primary business and increase agricultural labor. We show results in Table 6. In Liberia, we find a sizeable decline in casual labor of 7.5 hours (almost a 50% decline on the control mean of 17 hours per week), and we cannot reject that effects are linear in the grant amount. However, unlike prior papers, we do not detect an increase in labor on the farm, in the business, or in other jobs, suggesting an overall decline in labor supply. In Malawi, we observe no evidence of an effect on labor supply.

Intimate partner violence and psychological well-being

A key aim of this study was the measurement of intimate partner violence and psychological well-being, and we set up data-collection with the goal of measuring IPV as an outcome. To the extent possible, we enrolled the female head of the household in our surveys, the entire enumeration team was female, and we extensively piloted out the IPV modules in our survey questionnaire to ensure comprehension. As part of this endeavour, we also set up the most up-to-date interview protocols to confidentiality as well as respondent confidence.[30]

We report these results in Table 7. We start by noting that these contexts differ dramatically in reported IPV – 38% of women in Liberia report IPV of some sort in the past year (Column 4), compared to 18% in Malawi. In Liberia, where IPV is much more prevalent, we see a large reduction in reported IPV of 8 percentage points. There are declines in all sub-categories of IPV (emotional, physical and sexual), and effects are increasing in the grant size. However, we cannot reject equality (nor linearity) for any outcome. By contrast, we see no effect in Malawi.

We also measured psychosocial well-being, and we report here our two key measures: depression as measured by the PHQ-9 index, which a widely-used 9-question scale designed

[30]During this exercise, we became aware of an open measurement issue in this area, wherein the evidence on how best to ask these types of sensitive questions is inconclusive. Therefore, we also conducted an individual-level measurement experiment in which we asked about IPV experience using either face-to-face interviewing, or audio computer assisted self-interviewing (ACASI). The results of that experiment are reported in Park et al. (2024); the key result is that our evidence suggests that data collected via FTFI is more reliable than ACASI in this setting. As such, we rely only on FTFI reports here.

to screen, diagnose and monitor depression; as well as a "happiness index" that is based on the happiness questions which are included in the World Values Survey.[31] The happiness questions measure overall life satisfaction, but also feelings of control over one's circumstances as well as over one's financial situation. These subjective perceptions of well-being, especially those in financial matters, could arguably be impacted by cash transfers.

In Liberia, we find a 0.76 point decline in the PHQ-9 (about 0.18 standard deviations) and a 0.38 standard deviation increase in the happiness index. In Malawi, there is a much smaller and not significant negative point estimate in PHQ-9 and a smaller but significant 0.1 standard deviation increase in happiness. Effects are generally increasing in the grant size, though we cannot reject equality for any outcome (nor linearity).

While important in their own right, we view these effects as further indication of a lasting effect of the transfers at the time of the endline, 18-25 months after the cash transfers, which is consistent with other evidence shown earlier.

4 Conclusion

We use high-frequency panel data and in-person surveys to measure the evolution and persistence of the effect of UCTs among farming households in rural Liberia and Malawi. We find evidence that effects on food security and expenditures attenuate after about 6 months, but that persistent positive effects on food security are achieved for up to 2 years post-transfer. Effects appear to be driven by increased agricultural output, rather than through enterprise income or other sources.

Our results confirm the commonly-discussed but rarely tested notion that the measurement of treatment effects of interventions such as cash will vary over time. Our results suggest that the somewhat arbitrary timing of many endlines around a year from disbursement may actually capture lasting food security;[32] at the same time, we document that much of the

[31] Responses to the five happiness and life satisfaction questions from the World Values Survey are standardized into a z-score per Anderson (2008).

[32] For example, the endlines in Haushofer and Shapiro (2016) and McIntosh and Zeitlin (2024) were 9 and 13

impact on food security and other outcomes is missed without higher frequency data. An open question for future work is what the effects become in the next period. It is unclear whether higher harvest income and further investment will cause these effects to accrete over time, or if the effects may attenuate as the new capital stocks depreciate.

This paper raises several questions for future work. First, what size transfer would be most effective to generate lasting effects for agricultural households such as those in our study?[33] Theoretically, larger transfers may be better at spurring investment and therefore, generating persistent effects either if investments are lumpy (Balboni et al. 2021) or if households are close to subsistence, and therefore, a large proportion of the "smaller" transfers ends up being consumed soon after receipt, i.e., if the marginal propensity to consume is diminishing in transfer size. In this paper, we find that larger transfers were more effective in inducing certain kinds of investment responses, such as in livestock and irrigation (in the case of Malawi), and farm labor (in the case of Liberia) as well as in durable assets such as housing. Yet many other outcomes are similarly-sized, for example, harvest gains are similar for the small as well as the large transfers.

We also note that in the setting that we study (and other similar contexts), households often face other constraints that may prevent them from making productive investments, such as limits in entrepreneurial ability (Banerjee et al. 2024; Beaman et al. 2023; Maitra et al. 2017), missing markets for risk mitigation (Cole et al. 2017; Emerick et al. 2016; Ghosh and Vats 2023; Karlan et al. 2014), or, in remote contexts, poor access to markets, such as those for farm inputs (Aggarwal et al. 2024a; Cedrez et al. 2020; Minten et al. 2013). Therefore, one way to increase the efficacy of cash transfers may be to combine them with complementary "cash-plus" interventions. Since our study was set in an agrarian context with limited market access, we cross cut our treatment arms with an "input fair" treatment

months after the final transfers respectively. The first endline in Blattman et al. (2014) was after two years, a timeline similar to ours.

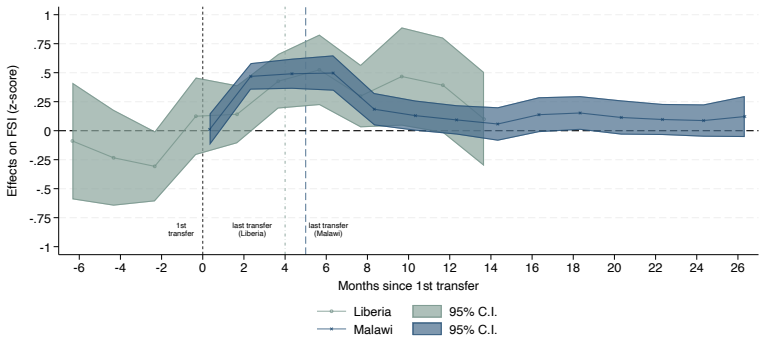
[33] See Kondylis and Loeser (2024) for a discussion on this subject, structured around a meta-analysis of the UCT and ultra-poor graduation literature.

in Malawi,[34] which we describe in greater detail in our companion paper Aggarwal et al. (2024b). Broadly, we find that the input fair treatment boosts the effect of cash-alone on input expenditures by 50%. While effective, market access is only one out of a large set of potential cash-plus interventions, such as entrepreneurial training and mentorship, insurance or access to savings devices. Testing and identifying the most effective of these may be a fruitful avenue for future research in this area.

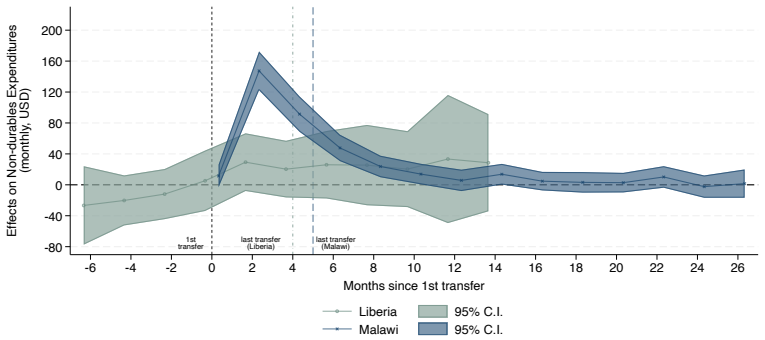
[34] We had originally planned to conduct the input fair intervention at both our study sites, but we missed the relevant planting season in Liberia due to the pandemic.

Figure 1: Dynamic Effects of Cash on Food Security, Expenditures, Large Purchases, and Income

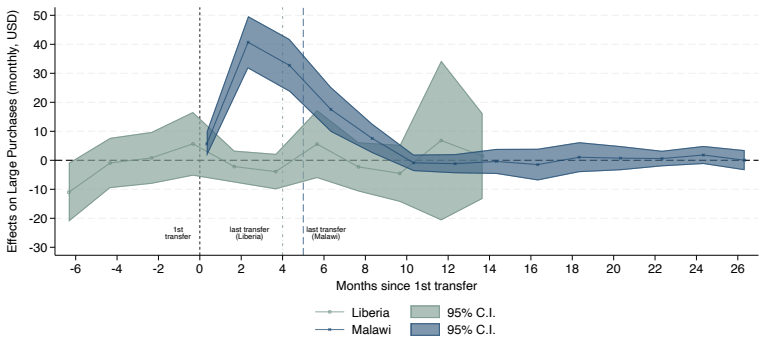
(a) Food Security Index[a]



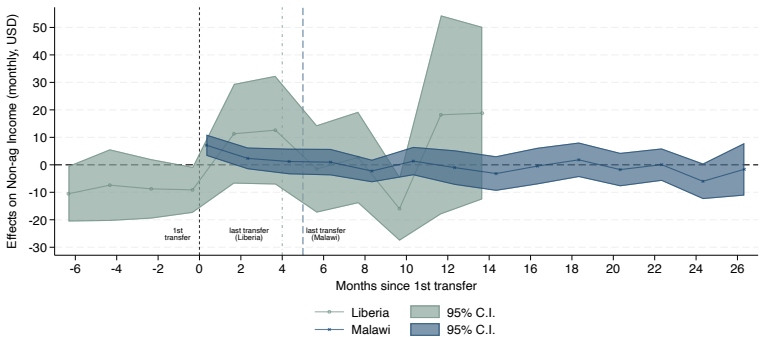
(b) Non-durables Expenditures



(c) Large Purchases[b]



(d) Non-agricultural Income



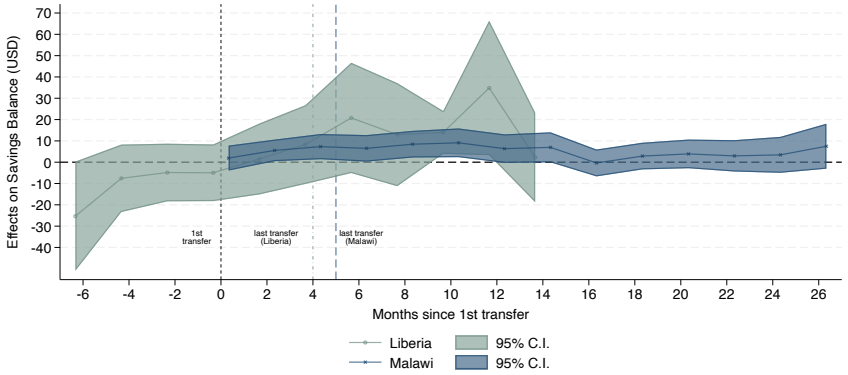
Note: Regressions include baseline measurement of outcome and strata fixed effects. Standard errors clustered at village level. First transfer for each treatment household was made across July-October 2019 for Malawi and March-September 2020 for Liberia (Wave 2). Sample includes only those households receiving "lump-sum" transfers (see text for details). Sample includes 596 households in Malawi and 253 in Liberia (Wave 2).

[a]Outcome variable is Food Security Index (FSI), a re-standardized z-score of HDDS, FCS, and HHS (negatively weighted) per Anderson (2008).

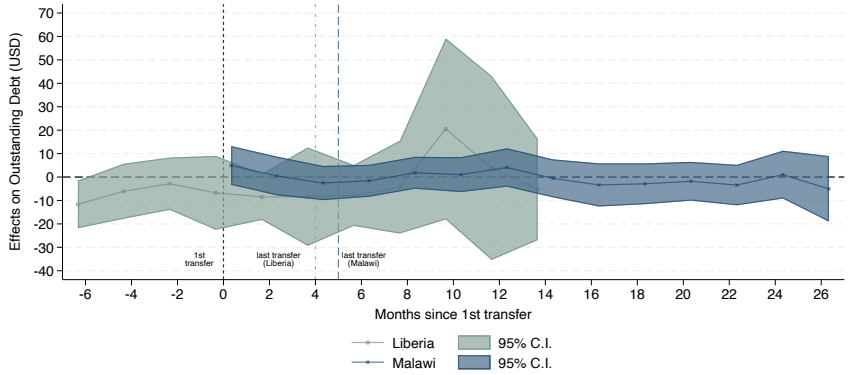
[b]Purchases of health preventatives (e.g. bednets, family planning, water purification), durables (e.g. furniture, electronics, livestock), and farm investments (e.g. farm tool, fertilizer/hybrid seeds).

Figure 2: Dynamic Effects of Cash on Interpersonal Transfers, Savings, and Debt

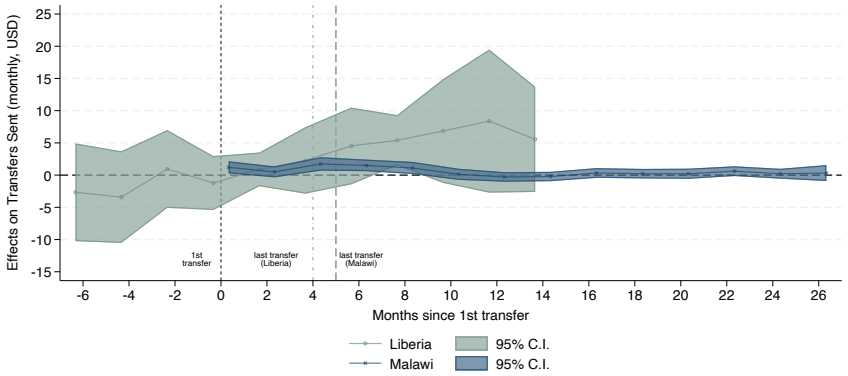
(a) Savings Balance



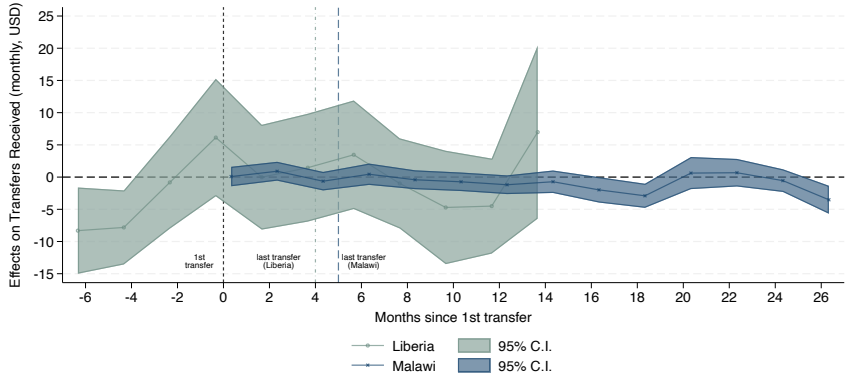
(b) Debt Amount



(c) Inter-personal Transfers Sent



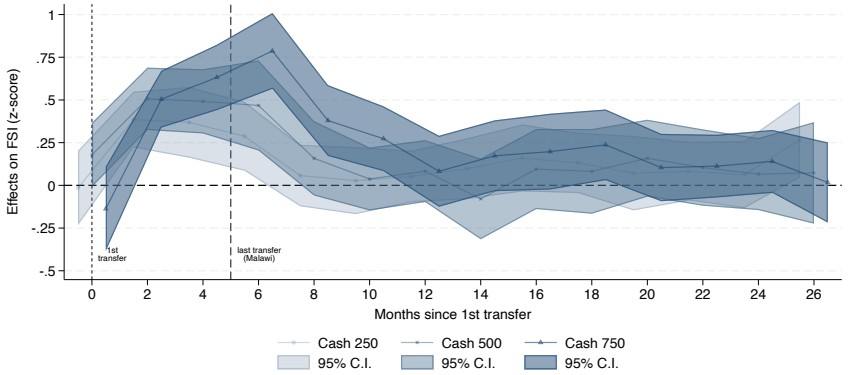
(d) Inter-personal Transfers Received



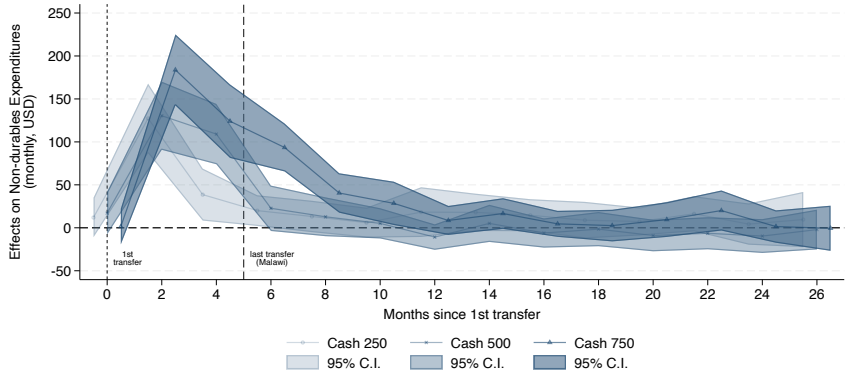
Note: Data comes from phone surveys, and transfers are measured over the past month. Regressions include baseline measurement of outcome and strata fixed effects. Standard errors clustered at village level. First transfer for each treatment household was made across July-October 2019 for Malawi and March-September 2020 for Liberia (Wave 2). Sample includes only those households receiving "lump-sum" transfers (see text for details). Sample includes 596 households in Malawi and 253 in Liberia (Wave 2).

Figure 3: Effects of Different Grant Sizes on Dynamics of Main Outcomes (Malawi only)

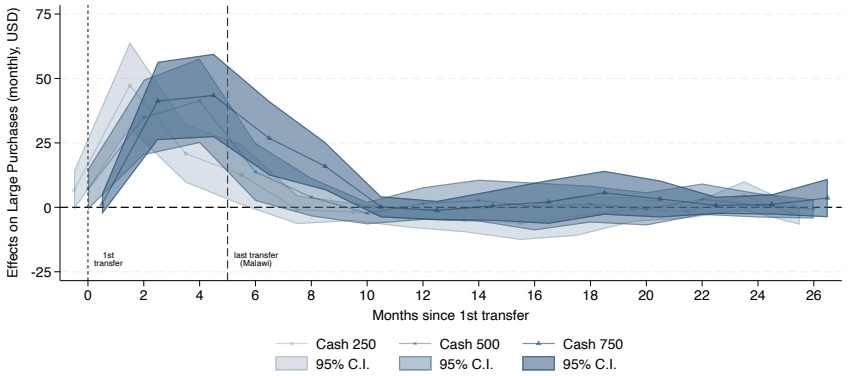
(a) Food Security Index[a]



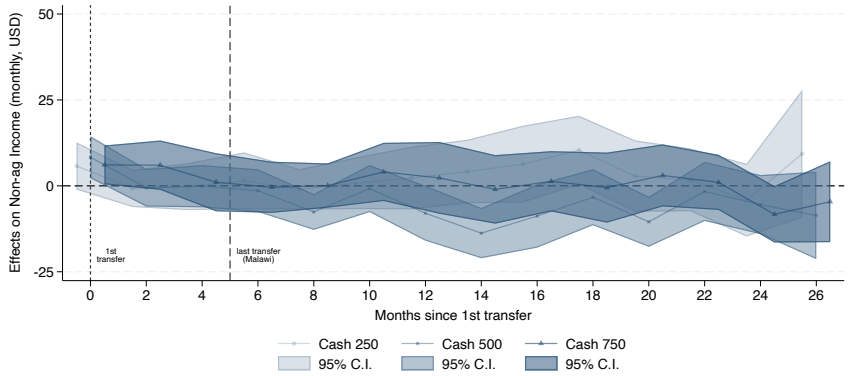
(b) Non-durables Expenditures



(c) Large Purchases



(d) Non-agricultural Income



Note: Sample includes data from Malawi only (596 households). Regressions include baseline measurement of outcome, strata fixed effects, and treatment indicators for market access and cash times market access. Standard errors are clustered at village level. First transfer for each treatment household was made during July-October 2019 for Malawi.
[a]Outcome variable is Food Security Index (FSI), a re-standardized z-score of HDDS, FCS, and HHS (negatively weighted) per Anderson (2008).

Table 1: Baseline Summary Statistics and Experimental Balance

	(1)	(2)	(3)	(4)	(5)	(6)
	Liberia			Malawi		
	Control Mean [SD]	p-value: pooled treatment = control	p-value: equality over 4 arms	Control Mean [SD]	p-value: pooled treatment = control	p-value: equality over 4 arms
Panel A. Demographics						
=1 if female	0.77	0.770	0.780	0.94	0.648	0.600
=1 if currently married or has partner	0.85	0.347	0.717	0.67	0.166	0.534
Age	39.23	0.329	0.636	40.65	0.439	0.873
	[13.92]			[15.05]		
Years of education	2.89	0.427	0.163	4.72	0.572	0.712
	[3.74]			[3.40]		
Number of household members	4.62	0.338	0.688	4.79	0.427	0.698
	[2.20]			[2.10]		
=1 if housing roof material is thatch	0.23	0.265	0.366	0.50	0.764	0.221
=1 if planted/harvested any crop (past season)	0.88	0.704	0.693	0.99	0.128	0.171
=1 if earns any non-agricultural income	0.50	0.830	0.450	0.47	0.733	0.522
=1 if operates own business	0.23	0.983	0.628	0.21	0.512	0.570
Panel B. Baseline measures of key outcomes						
Food security index (z-score, past year)	0.00	0.718	0.002	-0.00	0.462	0.762
	[1.00]			[0.99]		
Food expenditure (past month)	50.55	0.551	0.700	39.04	0.833	0.795
	[40.82]			[41.04]		
Total expenditure (past month)	120.14	0.485	0.632	92.35	0.978	0.952
	[94.35]			[86.74]		
Net value of durables, livestock, financial assets	254.26	0.463	0.577	251.47	0.373	0.784
	[513.86]			[524.84]		
Non-agricultural income (past month)	16.16	0.116	0.391	15.50	0.907	0.175
	[38.46]			[40.25]		
Observations		1,843			2,784	

Note: Columns 1 and 4 present the mean for the control groups; Columns 2 and 5 report the p-values for testing difference between the pooled cash treatment and control groups; Columns 3 and 6 report the p-values for testing difference across individual treatment arms by cash amounts (i.e. 250, 500, or 750 dollars) and the control group. Standard deviations are in square brackets in Columns 1 and 4 and standard errors clustered at village level in parentheses in Columns 2,3,5 and 6. Monetary outcomes are in USD PPP and Winsorized at the 99th percentile.

Table 2: Cumulative Treatment Effect on Flow Variables and Endline Value of Stock Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Aggregated over phone survey rounds[a]					At endline	
	Food Security Index[b]	Non-durables Expenditures	Non-agricultural Income	Inter-personal Transfers Sent	Inter-personal Transfers Received	Value of Non-monetary Assets[c]	Net Cash Savings[d]
Panel A. Liberia							
Pooled cash treatment:							
Cash	3.01	107.90	63.31	26.70	0.86	244.89	21.18
	(0.86)	(186.02)	(60.07)	(16.25)	(28.84)	(95.04)	(9.37)
Individual treatments by cash amount:							
Cash 250 (β_1)	1.61	-311.78	21.61	0.36	-9.99	85.78	17.01
	(1.58)	(208.52)	(82.02)	(26.64)	(52.23)	(120.95)	(13.20)
Cash 500 (β_2)	3.28	129.59	137.85	27.06	18.76	339.37	22.71
	(1.21)	(242.32)	(107.14)	(18.18)	(54.48)	(153.76)	(12.34)
Cash 750 (β_3)	4.04	481.36	25.43	51.12	-7.74	295.64	23.07
	(1.23)	(377.36)	(97.31)	(32.56)	(28.98)	(175.74)	(18.00)
Control mean	1.41	1,643.47	250.17	56.42	115.93	969.90	35.03
Control SD	6.21	1,132.41	305.22	91.63	161.60	1,744.72	169.32
p-values:							
$\beta_1 = \beta_2 = \beta_3$	0.444	0.099	0.628	0.455	0.894	0.337	0.934
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.908	0.123	0.611	0.837	0.898	0.710	0.777
No. of respondents	231	231	231	231	231	1,843	1,843
Observations	231	231	231	231	231	1,843	1,843
Panel B. Malawi							
Pooled cash treatment:							
Cash	3.96	680.37	-43.77	8.28	-23.69	359.98	8.52
	(1.23)	(133.95)	(51.81)	(5.50)	(14.00)	(132.82)	(3.52)
Individual treatments by cash amount:							
Cash 250 (β_1)	1.72	476.98	37.53	0.87	-30.24	70.99	3.45
	(1.44)	(174.44)	(72.13)	(7.42)	(16.96)	(160.37)	(5.50)
Cash 500 (β_2)	4.40	591.74	-121.04	0.41	-16.48	466.67	6.00
	(1.74)	(186.28)	(58.73)	(6.48)	(19.72)	(194.23)	(5.07)
Cash 750 (β_3)	5.74	970.11	-47.85	23.26	-24.38	542.44	16.09
	(1.51)	(162.97)	(71.53)	(9.00)	(17.79)	(149.49)	(8.14)
Control mean	1.67	2,188.26	590.50	29.31	70.47	1,802.84	-3.42
Control SD	14.08	1,437.18	449.72	55.49	170.34	2,801.31	61.58
p-values:							
$\beta_1 = \beta_2 = \beta_3$	0.027	0.027	0.105	0.053	0.805	0.015	0.485
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.911	0.539	0.147	0.159	0.279	0.567	0.826
No. of respondents	596	596	596	596	596	2,784	2,784
Observations	596	596	596	596	596	2,784	2,784

Note: Regressions are ANCOVA (i.e., including baseline measurement of the dependent variable) and strata fixed effects; for Malawi, regressions also include treatment indicators for market access and cash times market access. Results in the sub-panels on pooled and individual treatments are from separate regressions. Monetary outcomes are in USD PPP and winsorized at the 99th percentile. Standard errors clustered at the village level in parentheses.

[a] Monthly flow amounts reported in the phone surveys (14 months in total in Liberia; 26 months in Malawi) are aggregated. While each household was surveyed every other month, the values for the unsurveyed months are interpolated.

[b] Food Security Index is standardized z-score of HDDS, FCS, HHS (negatively weighted), and FIES (negatively weighted), using inverse covariance weighting (Anderson 2008) relative to the control mean and SD in each country.

[c] Stock variables at endline including durables, livestock, owned housing, business capital, and farm tools.

[d] Value of savings balance minus outstanding debt.

Table 3: Snapshot of Treatment Effects at Endline

	(1) Food Security Index[a]	(2) Non-durables Expenditures	(3) Non-agricultural Income	(4) Inter-personal Transfers Sent	(5) Inter-personal Transfers Received
Panel A. Liberia					
Pooled cash treatment:					
Cash	0.29	15.00	4.10	-1.67	-1.13
	(0.06)	(5.63)	(4.05)	(1.03)	(1.63)
Individual treatments by cash amount:					
Cash 250 (β_1)	0.15	-6.13	5.80	-3.20	-1.88
	(0.09)	(8.68)	(7.91)	(1.21)	(1.76)
Cash 500 (β_2)	0.18	29.03	5.71	-0.37	-2.06
	(0.08)	(7.65)	(6.21)	(1.28)	(1.64)
Cash 750 (β_3)	0.56	20.27	0.69	-1.59	0.63
	(0.09)	(8.99)	(5.19)	(1.47)	(3.38)
Control mean	0.00	142.66	21.04	5.18	6.83
Control SD	1.00	111.41	71.25	29.41	37.34
p-values:					
$\beta_1 = \beta_2 = \beta_3$	0.001	0.004	0.757	0.102	0.731
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.128	0.040	0.614	0.024	0.475
Observations	1,843	1,843	1,843	1,843	1,843
Panel B. Malawi					
Pooled cash treatment:					
Cash	0.11	2.14	0.38	0.10	0.57
	(0.05)	(3.12)	(2.81)	(0.22)	(0.67)
Individual treatments by cash amount:					
Cash 250 (β_1)	0.06	1.03	4.62	0.16	0.26
	(0.06)	(3.72)	(4.10)	(0.27)	(0.84)
Cash 500 (β_2)	0.12	0.33	-4.27	-0.17	0.38
	(0.06)	(4.03)	(3.31)	(0.23)	(0.83)
Cash 750 (β_3)	0.16	5.06	0.77	0.31	1.06
	(0.07)	(4.43)	(3.59)	(0.29)	(0.94)
Control mean	0.00	61.35	26.92	1.21	2.89
Control SD	1.00	63.22	58.62	5.28	12.36
p-values:					
$\beta_1 = \beta_2 = \beta_3$	0.265	0.578	0.081	0.127	0.683
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.982	0.746	0.087	0.132	0.924
Observations	2,784	2,784	2,784	2,784	2,784

Note: The endline was conducted about 18-22 months after first transfers were received in Liberia and 21-25 months in Malawi (see Figure A1 for more detail). Regressions are ANCOVA (include baseline measurement of the dependent variable) and strata fixed effects; for Malawi, regressions also include treatment indicators for market access and cash times market access. Results in the sub-panels on pooled and individual treatments are from separate regressions. Monetary outcomes are in USD PPP and winsorized at the 99th percentile. Standard errors clustered at the village level in parentheses.

[a] Food Security Index is standardized z-score of HDDS, FCS, HHS (negatively weighted), and FIES (negatively weighted), using inverse covariance weighting (Anderson 2008) relative to the control mean and SD in each country.

Table 4: Crop Production and Investment

	(1) Value of harvest (USD)	(2) Agricultural sales (USD)	(3) Number of crops grown	(4) Input purchase value (USD)	(5) Hired labor (USD)	(6) Invest in farm tools & irrigation (USD)	(7) Agricultural profit[a] (USD)	(8) Land under cultivation (acre)
Panel A. Liberia								
Pooled cash treatment:								
Cash	311.42	20.53	0.34	4.00	49.08	6.48	263.54	-0.20
	(108.08)	(25.66)	(0.10)	(4.69)	(16.16)	(2.45)	(100.63)	(0.97)
Individual treatments by cash amount:								
Cash 250 (β_1)	404.54	-22.32	0.32	-2.48	19.77	5.36	389.94	1.72
	(186.13)	(34.18)	(0.17)	(4.62)	(11.89)	(3.91)	(179.32)	(2.44)
Cash 500 (β_2)	227.55	39.11	0.34	3.97	35.49	5.51	206.91	-1.36
	(152.01)	(38.24)	(0.13)	(6.05)	(18.73)	(3.75)	(136.92)	(0.58)
Cash 750 (β_3)	312.26	42.01	0.35	10.37	92.57	8.65	202.05	-0.79
	(179.60)	(45.48)	(0.16)	(9.77)	(38.09)	(3.84)	(163.04)	(0.93)
Control mean	893.80	129.69	1.83	18.12	81.38	30.61	788.18	1.72
Control SD	1,662.86	443.07	1.69	69.06	228.79	44.23	1,583.24	18.97
p-values:								
$\beta_1 = \beta_2 = \beta_3$	0.740	0.325	0.990	0.307	0.144	0.768	0.648	0.350
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.284	0.514	0.451	0.486	0.670	0.810	0.212	0.218
Observations	1,843	1,843	1,843	1,843	1,843	1,843	1,843	1,843
Panel B. Malawi								
Pooled cash treatment:								
Cash	101.23	52.03	0.15	13.08	5.06	65.68	78.18	-0.68
	(40.09)	(21.63)	(0.05)	(2.93)	(4.28)	(31.88)	(43.84)	(0.47)
Individual treatments by cash amount:								
Cash 250 (β_1)	59.77	52.11	0.13	5.26	0.17	34.24	46.86	-0.82
	(50.19)	(29.78)	(0.07)	(3.31)	(5.40)	(35.82)	(54.05)	(0.55)
Cash 500 (β_2)	96.56	25.24	0.10	16.42	6.31	70.05	47.64	-0.95
	(49.01)	(24.35)	(0.07)	(3.82)	(5.24)	(39.65)	(53.86)	(0.48)
Cash 750 (β_3)	147.46	78.58	0.21	17.56	8.71	92.74	139.84	-0.26
	(50.03)	(30.07)	(0.07)	(3.82)	(5.73)	(47.30)	(57.76)	(0.63)
Control mean	613.26	97.08	2.23	52.49	19.27	140.99	513.31	1.96
Control SD	752.20	354.60	1.02	55.24	88.83	474.76	713.73	8.22
p-values:								
$\beta_1 = \beta_2 = \beta_3$	0.204	0.213	0.282	0.001	0.338	0.421	0.201	0.472
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.967	0.262	0.421	0.370	0.830	0.979	0.648	0.162
Observations	2,784	2,784	2,784	2,784	2,784	2,784	2,784	2,784

Note: The endline was conducted about 18-22 months after first transfers were received in Liberia and 21-25 months in Malawi. Regressions include baseline measurement and strata fixed effects; for Malawi, regressions also include treatment indicators for market access and cash times market access. Results in the subpanels on pooled and individual treatments are from separate regressions. Monetary outcomes are in USD PPP and winsorized at the 99th percentile. Standard errors clustered at the village level in parentheses.
[a] Agricultural profit is calculated as the value of harvest minus input costs, which include input purchases, hired labor, and investments in tools and irrigation; we assume the tools and irrigation investments depreciate annually by 20% over five years. Family labor is not included.

Table 5: Non-crop Investment and Enterprise Income

	(1) Livestock value (at endline)	(2) Housing & durables value (at endline)	(3) Education expend[a] (annualized)	(4) Health expend[b] (annualized)	(5) =1 if started enterprise since baseline	(6) Self-own enterprise capital value (at endline)	(7) Enterprise income (past month)
Panel A. Liberia							
Pooled cash treatment:							
Cash	26.18	197.03	27.40	5.17	0.03	7.91	3.33
	(12.76)	(93.09)	(16.00)	(4.16)	(0.02)	(4.78)	(2.85)
Individual treatments by cash amount:							
Cash 250 (β_1)	20.89	19.69	-11.53	0.03	0.02	20.39	7.85
	(19.95)	(113.16)	(22.39)	(4.81)	(0.02)	(9.54)	(6.33)
Cash 500 (β_2)	34.99	287.78	64.24	9.99	0.03	9.21	3.58
	(20.30)	(156.90)	(27.15)	(6.92)	(0.02)	(5.46)	(3.81)
Cash 750 (β_3)	21.68	271.24	24.20	4.90	0.04	-5.73	-1.35
	(20.40)	(172.91)	(25.00)	(7.03)	(0.03)	(6.49)	(2.32)
Control mean	99.50	823.92	128.80	27.98	0.08	16.82	7.34
Control SD	243.65	1,667.81	251.58	70.32	0.27	85.50	60.86
p-values:							
$\beta_1 = \beta_2 = \beta_3$	0.844	0.247	0.081	0.429	0.797	0.034	0.197
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.592	0.638	0.148	0.598	0.974	0.015	0.220
Observations	1,843	1,843	1,332	1,843	1,843	1,843	1,843
Panel B. Malawi							
Pooled cash treatment:							
Cash	40.46	323.77	-7.40	-1.66	-0.02	-4.02	-1.61
	(16.37)	(127.53)	(6.45)	(1.10)	(0.01)	(2.49)	(1.51)
Individual treatments by cash amount:							
Cash 250 (β_1)	2.24	77.43	-7.28	-1.76	0.00	-5.17	-1.65
	(18.05)	(156.37)	(8.90)	(1.40)	(0.02)	(2.79)	(1.79)
Cash 500 (β_2)	61.64	406.50	-12.92	-0.49	-0.03	-5.37	-4.25
	(21.29)	(186.32)	(7.50)	(1.43)	(0.02)	(3.30)	(1.85)
Cash 750 (β_3)	57.57	487.89	-2.19	-2.71	-0.01	-1.52	1.05
	(23.44)	(146.28)	(8.04)	(1.23)	(0.02)	(3.20)	(2.41)
Control mean	139.40	1,621.78	61.86	7.11	0.10	14.39	6.77
Control SD	345.75	2,690.94	130.01	22.80	0.30	60.03	34.21
p-values:							
$\beta_1 = \beta_2 = \beta_3$	0.006	0.038	0.328	0.287	0.165	0.453	0.090
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.179	0.700	0.179	0.360	0.220	0.138	0.057
Observations	2,784	2,784	2,158	2,784	2,784	2,784	2,784

Note: All outcomes are in USD PPP and Winsorized at the 99th percentile. The endline was conducted about 18-22 months after first transfers were received in Liberia and 21-25 months in Malawi. Regressions include baseline measurement and strata fixed effects; for Malawi, regressions also include treatment indicators for market access and cash times market access. Results in the sub-panels on pooled and individual treatments are from separate regressions. Standard errors clustered at the village level in parentheses.

[a] Sample restricted to households with any school-aged children (age 6-18).

[b] Includes investments in health preventatives.

Table 6: Labor Supply

	(1)	(2)	(3)	(4)
	Number of labor hours supplied on (past month):			
	Casual labor	Own farm	Own enterprise	Other job
Panel A. Liberia				
Pooled cash treatment:				
Cash	-7.54	-0.04	-0.17	0.64
	(1.79)	(3.64)	(2.00)	(0.79)
Individual treatments by cash amount:				
Cash 250 (β_1)	-5.29	1.03	1.13	-1.24
	(2.92)	(5.77)	(3.46)	(0.63)
Cash 500 (β_2)	-8.28	-2.93	-2.72	1.29
	(2.40)	(4.89)	(2.44)	(1.29)
Cash 750 (β_3)	-8.94	2.07	1.37	1.78
	(2.04)	(5.30)	(3.10)	(1.55)
Control mean	16.98	43.50	9.09	1.98
Control SD	39.93	70.13	38.66	14.84
p-values:				
$\beta_1 = \beta_2 = \beta_3$	0.486	0.709	0.422	0.044
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.472	0.707	0.408	0.026
Observations	1,843	1,843	1,843	1,843
Panel B. Malawi				
Pooled cash treatment:				
Cash	0.45	1.08	0.79	0.19
	(2.37)	(0.92)	(1.29)	(1.17)
Individual treatments by cash amount:				
Cash 250 (β_1)	2.13	-0.45	2.21	1.33
	(2.95)	(0.98)	(1.79)	(1.49)
Cash 500 (β_2)	-0.23	2.00	0.34	0.01
	(2.90)	(1.36)	(1.61)	(1.57)
Cash 750 (β_3)	-0.55	1.69	-0.17	-0.78
	(2.95)	(1.27)	(1.65)	(1.37)
Control mean	21.90	9.85	6.21	3.69
Control SD	47.52	19.48	29.29	25.84
p-values:				
$\beta_1 = \beta_2 = \beta_3$	0.623	0.089	0.465	0.354
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.665	0.294	0.402	0.487
Observations	2,784	2,784	2,784	2,784

Note: Labor supply hours are summed up between female and male household heads. Regressions include baseline measurement and strata fixed effects; for Malawi, regressions also include treatment indicators for market access and cash times market access. Results in the sub-panels on pooled and individual treatments are from separate regressions. Standard errors clustered at the village level in parentheses. Nonbinary outcomes are Winsorized at the 99th percentile.

Table 7: Intimate Partner Violence and Psychological Well Being

	(1) Emotional IPV	(2) Physical IPV	(3) Sexual IPV	(4) Any IPV	(5) Depression (PHQ-9) Index	(6) Happiness Index[a]
Panel A. Liberia						
Pooled cash treatment:						
Cash	-0.10	-0.04	-0.04	-0.08	-0.76	0.38
	(0.03)	(0.03)	(0.02)	(0.04)	(0.27)	(0.05)
Individual treatments by cash amount:						
Cash 250 (β_1)	-0.06	-0.02	-0.03	-0.04	-0.24	0.26
	(0.05)	(0.04)	(0.02)	(0.06)	(0.47)	(0.08)
Cash 500 (β_2)	-0.10	-0.05	-0.04	-0.10	-1.15	0.40
	(0.05)	(0.04)	(0.02)	(0.05)	(0.36)	(0.08)
Cash 750 (β_3)	-0.14	-0.04	-0.06	-0.10	-0.87	0.47
	(0.05)	(0.05)	(0.02)	(0.06)	(0.42)	(0.07)
Control mean	0.34	0.23	0.10	0.38	4.76	0.00
Control SD	0.48	0.42	0.31	0.49	4.44	1.00
p-values:						
$\beta_1 = \beta_2 = \beta_3$	0.551	0.802	0.568	0.659	0.259	0.104
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.972	0.921	0.787	0.844	0.363	0.315
Observations	867	867	867	867	1,298	1,843
Panel B. Malawi						
Pooled cash treatment:						
Cash	0.01	-0.00	0.00	0.01	-0.15	0.10
	(0.01)	(0.01)	(0.01)	(0.02)	(0.20)	(0.05)
Individual treatments by cash amount:						
Cash 250 (β_1)	0.02	-0.00	0.01	0.02	-0.02	0.04
	(0.02)	(0.01)	(0.01)	(0.02)	(0.27)	(0.06)
Cash 500 (β_2)	0.00	0.01	0.01	0.02	-0.02	0.14
	(0.02)	(0.01)	(0.01)	(0.02)	(0.25)	(0.07)
Cash 750 (β_3)	0.00	-0.01	-0.01	-0.00	-0.42	0.12
	(0.02)	(0.01)	(0.01)	(0.02)	(0.25)	(0.07)
Control mean	0.14	0.08	0.07	0.18	4.56	0.00
Control SD	0.35	0.27	0.26	0.39	4.22	1.00
p-values:						
$\beta_1 = \beta_2 = \beta_3$	0.667	0.501	0.161	0.589	0.252	0.294
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.611	0.556	0.266	0.495	0.535	0.634
Observations	1,829	1,829	1,829	1,829	2,733	2,784

Note: IPV is measured over the past year, while psychological well-being is over the past 2 weeks. For IPV, IPV was measured using face-to-face interviewing. Regressions include baseline measurement and strata fixed effects; for Malawi, regressions also include treatment indicators for market access and cash times market access. Results in the sub-panels on pooled and individual treatments are from separate regressions. Standard errors clustered at the village level in parentheses.

[a] Responses to World Values Survey happiness questions are standardized using inverse covariance weighting (Anderson 2008).

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Appendix A. Additional Results

Figure A1: Timeline of Cash Transfer Disbursements and Survey Activities

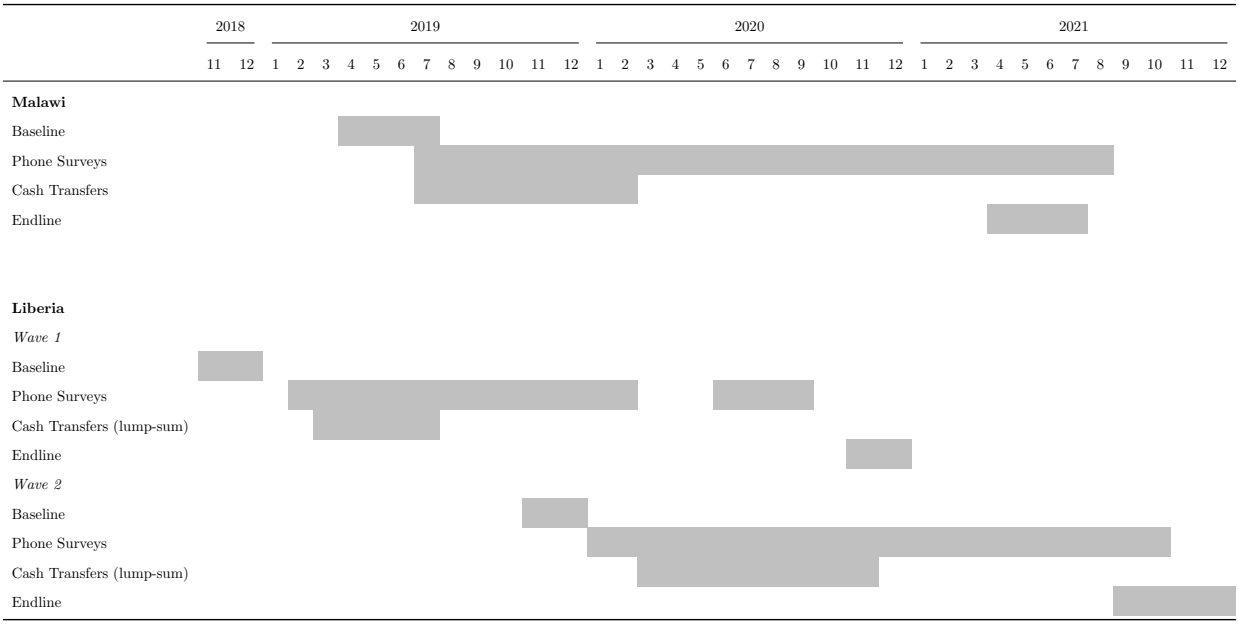
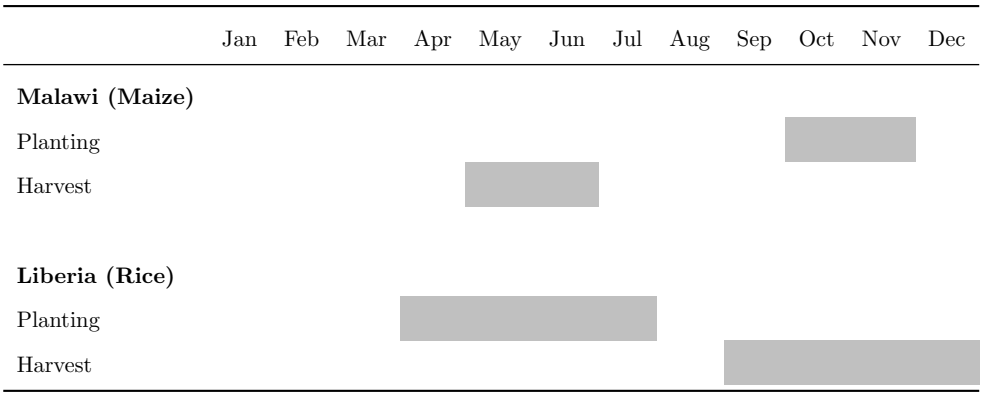


Figure A2: Crop Calendar for Staple Crops

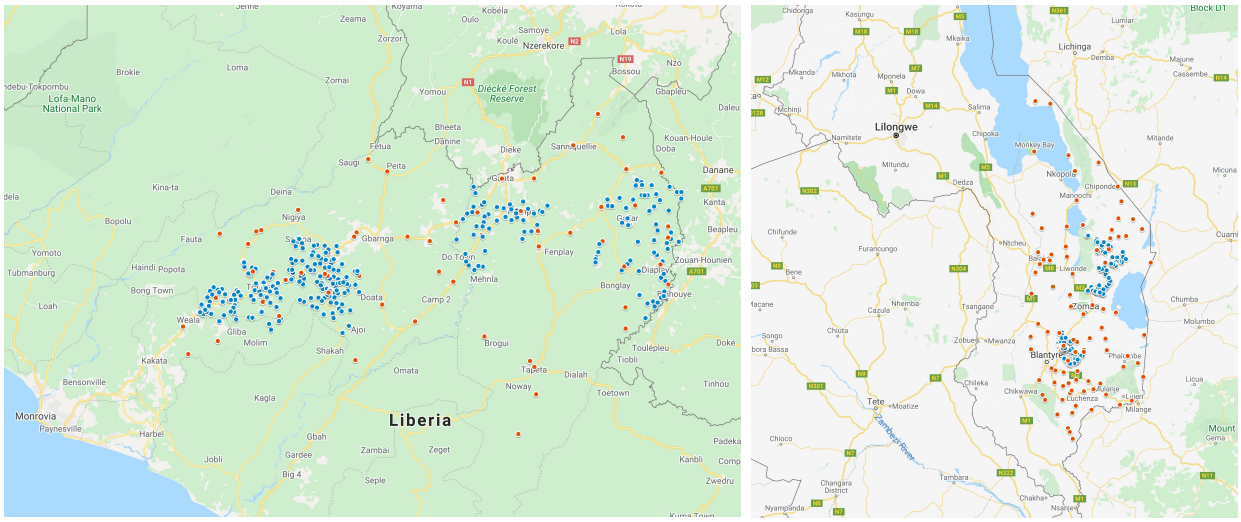


Note: FAO GIEWS (Global Information and Early Warning System) country briefs for Malawi and Liberia.

Figure A3: Map of Study Villages and Markets in Liberia and Malawi

(a) Liberia

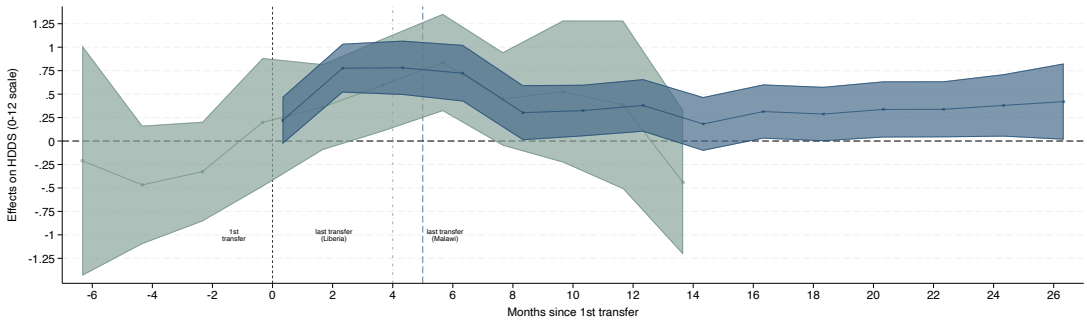
(b) Malawi



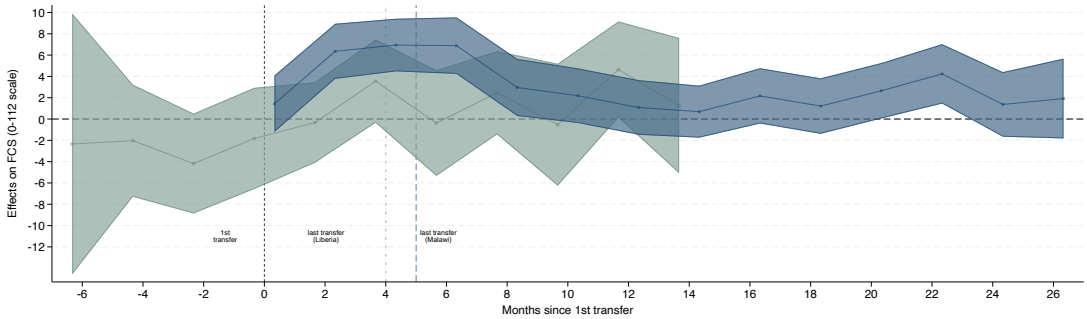
Note: Blue dots refer to villages, and orange dots markets. For Liberia, there are 300 villages and 80 markets. For Malawi, there are 300 villages and 95 markets.

Figure A4: Effects on Individual Components of Food Security Index (HDDS, FCS, and HHS)

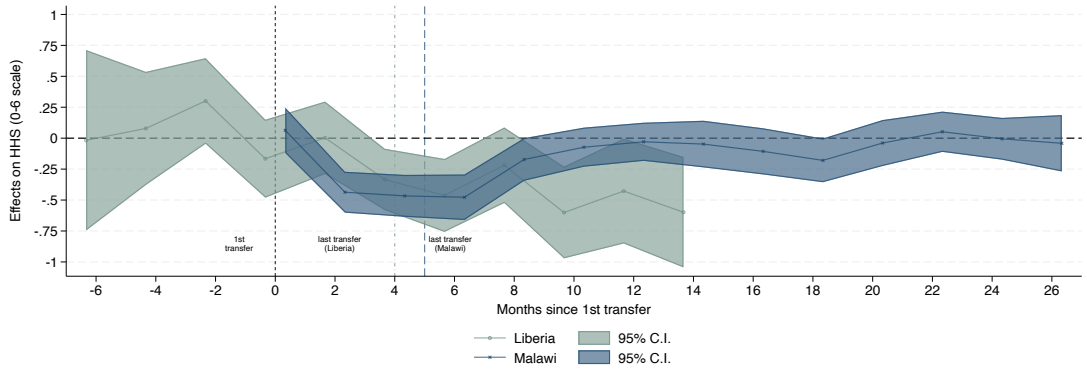
(a) Household Dietary Diversity Score (baseline control mean = 5.9, 5.4)



(b) Food Consumption Score (baseline control mean = 51.3, 46.3)



(c) Household Hunger Scale (baseline control mean = 0.9, 1.2)



Note: Regressions include baseline measurement and strata fixed effects; for Malawi, regressions also include treatment indicators for market access and cash times market access. Standard errors are clustered at village level. First transfer for each treatment household was made across July-October 2019 for Malawi and March-September 2020 for Liberia (Wave 2). Sample includes 596 households in Malawi and 253 in Liberia (Wave 2).

Table A1: Endline Survey Attrition

	(1)	(2)	(3)	(4)
	=1 if completed endline survey		=1 if completed IPV survey at endline[a]	
	Liberia	Malawi	Liberia	Malawi
Cash	-0.00	0.01	0.02	0.05
	(0.01)	(0.01)	(0.02)	(0.02)
Control mean	0.96	0.94	0.69	0.63
Overall mean	0.96	0.95	0.70	0.66
Observations	2,715	2,944	2,595	2,784

Note: Regressions include strata fixed effects. Standard errors clustered at village level in parentheses.
[a] Sample restricted to female respondents.

Table A2: Phone Survey Attrition

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	=1 if completed survey in following survey round														
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	=1 if ≥ 1R	% of rounds
Panel A. Liberia (Wave 2)															
Cash	-0.01	-0.05	-0.00	-0.05	-0.04	0.01	-0.07							-0.07	-0.04
	(0.05)	(0.06)	(0.05)	(0.06)	(0.06)	(0.06)	(0.07)							(0.04)	(0.04)
Control mean	0.61	0.70	0.71	0.72	0.64	0.62	0.57							0.90	0.67
Overall mean	0.61	0.68	0.71	0.71	0.63	0.62	0.55							0.88	0.66
Observations	287	287	287	287	287	287	287							287	287
Panel B. Malawi															
Cash	0.01	-0.03	-0.03	0.01	-0.03	-0.02	-0.04	-0.03	-0.02	0.04	-0.00	-0.00	-0.00		-0.01
	(0.01)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)		(0.02)
Control mean	0.97	0.95	0.87	0.91	0.93	0.95	0.96	0.94	0.89	0.84	0.86	0.80	0.62	1.00	0.88
Overall mean	0.97	0.94	0.85	0.91	0.92	0.93	0.94	0.93	0.87	0.86	0.86	0.80	0.61	1.00	0.88
Observations	596	596	596	596	596	596	596	596	596	596	596	596	596	596	596

Note: Each survey round is two months, where half of the sample is called in the even month and the other in the odd month. Regressions include strata fixed effects. Standard errors clustered at village level in parentheses.

Table A3: Correlates of participation in phone surveys

	(1)	(2)
	% of HHPS rounds reached	
	Liberia	Malawi
	Coefficient (standard error)	Coefficient (standard error)
Panel A. Demographics		
=1 if female	-0.05	-0.05
	(0.08)	(0.06)
=1 if currently married or has partner	-0.10	0.03
	(0.05)	(0.11)
Age	4.90	9.02
	(2.51)	(4.08)
Years of education	0.83	2.37
	(0.62)	(0.82)
Number of household members	-0.25	0.00
	(0.38)	(0.51)
=1 if housing roof material is thatch	-0.17	-0.55
	(0.07)	(0.10)
=1 if planted/harvested any crop (past season)	0.03	0.01
	(0.03)	(0.02)
=1 if earns any non-agricultural income	-0.01	-0.07
	(0.08)	(0.12)
=1 if operates own business	-0.02	0.11
	(0.07)	(0.11)
Panel B. Baseline measures of key outcomes		
Food security index (z-score, past year)	0.11	0.38
	(0.16)	(0.21)
Food expenditure (past month)	14.41	11.44
	(6.50)	(8.59)
Total expenditure (past month)	38.33	43.06
	(14.54)	(17.34)
Net value of durables, livestock, financial assets	111.34	326.13
	(71.56)	(122.84)
Non-agricultural income (past month)	4.49	-3.92
	(6.74)	(8.28)
Observations	287	596

Note: Each cell reports the coefficient and standard errors in parentheses for a bivariate regression of each baseline characteristic and the percentage of household phone survey (HHPS) rounds reached. Standard errors clustered at village level in parentheses. Monetary outcomes are in USD PPP and winsorized at the 99th percentile.

Table A4: Treatment effects from pooled phone survey rounds

	(1) Food Security Index[a] (past month)	(2) Total Expenditures (past month)	(3) Large Purchases (past month)	(4) Non-agricultural Income (past month)	(5) Savings Balance	(6) Debt Amount	(7) Inter-personal Transfers Sent (past month)	(8) Inter-personal Transfers Received (past month)
Panel A. Liberia								
Pooled cash treatment:								
Cash	0.35	42.20	1.18	0.57	10.37	-6.89	3.17	1.65
	(0.10)	(21.08)	(3.55)	(6.42)	(6.14)	(5.69)	(1.56)	(3.29)
Individual treatments by cash amount:								
Cash 250 (β_1)	0.15	-40.90	-12.90	-3.03	5.29	-4.78	-1.38	-1.26
	(0.16)	(29.42)	(4.24)	(11.18)	(6.45)	(7.41)	(2.80)	(5.82)
Cash 500 (β_2)	0.45	40.58	1.69	6.64	17.13	-10.59	3.87	2.66
	(0.14)	(25.34)	(4.53)	(10.55)	(7.76)	(6.40)	(2.25)	(4.96)
Cash 750 (β_3)	0.35	75.54	6.19	-3.25	6.55	-4.54	4.31	1.91
	(0.13)	(30.60)	(4.98)	(7.08)	(8.13)	(8.15)	(2.13)	(3.53)
Control mean	0.19	189.19	17.50	26.64	11.44	16.61	6.46	12.17
Control SD	0.89	148.36	34.05	45.73	45.77	52.26	15.46	24.68
p-values:								
$\beta_1 = \beta_2 = \beta_3$	0.222	0.003	0.000	0.595	0.363	0.731	0.093	0.794
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.307	0.055	0.000	0.589	0.268	0.488	0.342	0.864
No. of respondents	237	237	237	237	237	237	237	237
Observations	1,067	1,067	1,067	1,067	1,067	1,067	1,067	1,067
Panel B. Malawi								
Pooled cash treatment:								
Cash	0.18	35.02	7.32	-2.00	4.26	-2.14	0.39	-1.01
	(0.05)	(6.44)	(1.60)	(2.10)	(2.66)	(2.98)	(0.24)	(0.61)
Individual treatments by cash amount:								
Cash 250 (β_1)	0.09	28.48	4.52	1.26	2.34	1.11	0.15	-1.17
	(0.06)	(8.72)	(1.81)	(2.93)	(3.72)	(4.16)	(0.33)	(0.73)
Cash 500 (β_2)	0.21	28.64	7.05	-5.63	3.19	-4.20	0.02	-0.67
	(0.07)	(8.74)	(2.36)	(2.24)	(3.17)	(3.45)	(0.29)	(0.86)
Cash 750 (β_3)	0.24	48.51	10.53	-1.74	7.34	-3.48	1.01	-1.20
	(0.06)	(7.75)	(1.99)	(2.96)	(3.78)	(3.61)	(0.39)	(0.77)
Control mean	0.08	110.47	15.16	25.07	18.81	27.29	1.36	3.04
Control SD	0.91	105.81	29.57	34.66	36.56	50.73	4.99	11.62
p-values:								
$\beta_1 = \beta_2 = \beta_3$	0.047	0.046	0.022	0.052	0.464	0.410	0.072	0.853
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.799	0.224	0.822	0.064	0.861	0.643	0.184	0.433
No. of respondents	596	596	596	596	596	596	596	596
Observations	6,693	6,696	6,696	6,696	6,696	6,696	6,696	6,696

Note: Regressions include all observations collected from the phone surveys. Regressions include baseline measurement and strata fixed effects; for Malawi, regressions also include treatment indicators for market access and cash times market access. Results in the sub-panels on pooled and individual treatments are from separate regressions. Monetary outcomes are in USD PPP and winsorized at the 99th percentile. Standard errors clustered at the village level in parentheses.

[a] Food Security Index is standardized z-score of HDDS, FCS, and HHS (negatively weighted), using inverse covariance weighting (Anderson 2008) relative to the control mean and SD in each country at baseline.

Table A5: Cross-sectional Correlation between Agricultural Inputs and Output

	(1)	(2)
	Total harvest value (USD)	
	Liberia	Malawi
Number of crops	260.67	168.75
	(30.25)	(18.57)
Input purchase value (USD)	4.01	2.09
	(1.87)	(0.51)
Hired labor (USD)	1.62	2.35
	(0.43)	(0.68)
Investment in farm tools and irrigation (USD)	4.67	-0.03
	(1.47)	(0.03)
Land under cultivation (acre)	1.32	1.31
	(3.04)	(1.79)
Livestock value (USD)	0.75	0.24
	(0.26)	(0.09)
Overall mean	842.07	588.08
Overall SD	1,612.06	711.20
R-squared	0.286	0.271
Observations	1,299	1,377

Note: Control group only. All outcomes are in USD PPP and winsorized at the 99th percentile. Standard errors clustered at the village level in parentheses.

Table A6: Heterogeneity by baseline enterprise ownership

	(1) Capital value	(2) Income
Panel A. Liberia		
Cash	7.41	2.98
	(3.89)	(3.30)
Cash × Enterprise	2.36	1.96
	(17.09)	(7.06)
Enterprise at baseline	10.32	4.84
	(8.32)	(3.63)
No cash × no enterprise: mean	7.91	6.01
No cash × no enterprise: SD	53.43	65.68
Observations	1,843	1,843
Panel B. Malawi		
Cash	-0.98	-2.23
	(2.24)	(1.40)
Cash × Enterprise	-13.10	3.45
	(6.86)	(4.88)
Enterprise at baseline	17.14	5.24
	(6.01)	(5.18)
No cash × no enterprise: mean	7.65	3.71
No cash × no enterprise: SD	40.33	22.90
Observations	2,784	2,784

Note: All outcomes are in USD PPP and Winsorized at the 99th percentile. The endline was conducted about 18-22 months after first transfers were received in Liberia and 21-25 months in Malawi. Regressions include baseline measurement and strata fixed effects; for Malawi, regressions also include treatment indicators for market access and cash plus market access. Standard errors are clustered at the village level in parentheses.

Table A7: Effects on Educational Outcomes

	(1)	(2)	(3)	(4)
	Proportion of children enrolled	Missed school days (past year)		Proportion of school days attended (past week)
		for any reason	due to lack of money	
Panel A. Liberia				
Pooled cash treatment:				
Cash	0.10	-3.83	-1.46	0.06
	(0.03)	(2.46)	(0.78)	(0.04)
Individual treatments by cash amount:				
Cash 250 (β_1)	0.00	-7.90	-2.71	0.04
	(0.04)	(2.03)	(0.58)	(0.07)
Cash 500 (β_2)	0.12	-0.53	-0.67	0.07
	(0.04)	(3.57)	(1.10)	(0.04)
Cash 750 (β_3)	0.16	-3.56	-1.14	0.08
	(0.04)	(4.86)	(1.60)	(0.04)
Control mean	0.52	12.24	3.43	0.89
Control SD	0.45	43.64	14.12	0.28
p-values:				
$\beta_1 = \beta_2 = \beta_3$	0.010	0.086	0.098	0.846
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.476	0.001	0.000	0.891
Observations	1,332	1,334	1,334	157
Panel B. Malawi				
Pooled cash treatment:				
Cash	-0.01	-1.68	-0.53	0.02
	(0.01)	(0.74)	(0.21)	(0.01)
Individual treatments by cash amount:				
Cash 250 (β_1)	-0.02	-1.32	-0.30	0.04
	(0.01)	(1.06)	(0.27)	(0.01)
Cash 500 (β_2)	-0.01	-2.08	-0.67	0.00
	(0.01)	(0.85)	(0.22)	(0.02)
Cash 750 (β_3)	-0.02	-1.65	-0.62	0.03
	(0.01)	(0.84)	(0.23)	(0.01)
Control mean	0.93	7.28	0.99	0.91
Control SD	0.20	13.11	4.14	0.22
p-values:				
$\beta_1 = \beta_2 = \beta_3$	0.821	0.737	0.233	0.073
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.600	0.381	0.216	0.015
Observations	2,158	2,158	2,158	1,757

Note: Sample restricted to households with any school-aged children (age 6-18). Regressions include baseline measurement and strata fixed effects; for Malawi, regressions also include treatment indicators for market access and cash times market access. Results in the sub-panels on pooled and individual treatments are from separate regressions. Standard errors clustered at the village level in parentheses. Non-binary outcomes are winsorized at the 99th percentile.

Table A8: Treatment effects on aggregated outcomes across phone survey rounds

	(1) Total Expenditures (past month)	(2) Large Purchases (past month)	(3) Non-agricultural Income (past month)	(4) Inter-personal Transfers Sent (past month)	(5) Inter-personal Transfers Received (past month)
Panel A. Liberia					
Pooled cash treatment:					
Cash	167.10	-0.02	3.91	14.53	4.25
	(118.32)	(14.48)	(29.23)	(7.18)	(14.50)
Individual treatments by cash amount:					
Cash 250 (β_1)	-224.33	-56.25	-30.72	-9.99	-14.71
	(149.49)	(18.31)	(49.77)	(10.91)	(18.25)
Cash 500 (β_2)	142.84	2.61	32.70	18.13	13.26
	(139.15)	(19.12)	(46.43)	(10.47)	(24.56)
Cash 750 (β_3)	400.05	28.32	-5.72	24.36	5.60
	(199.55)	(20.05)	(40.34)	(11.68)	(15.19)
Control mean	776.14	70.63	112.17	26.12	50.55
Control SD	594.06	115.35	143.60	45.77	71.49
p-values:					
$\beta_1 = \beta_2 = \beta_3$	0.010	0.000	0.475	0.021	0.417
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.064	0.001	0.471	0.139	0.489
No. of respondents	234	234	234	234	234
Observations	234	234	234	234	234
Panel B. Malawi					
Pooled cash treatment:					
Cash	373.62	79.74	-22.92	4.06	-10.73
	(77.60)	(17.88)	(24.85)	(2.61)	(6.67)
Individual treatments by cash amount:					
Cash 250 (β_1)	286.95	45.58	12.91	1.18	-13.33
	(102.99)	(20.71)	(34.24)	(3.71)	(8.11)
Cash 500 (β_2)	310.40	78.93	-59.77	0.73	-6.49
	(107.56)	(26.17)	(26.87)	(3.23)	(9.57)
Cash 750 (β_3)	522.28	113.99	-21.98	10.16	-12.37
	(97.34)	(23.61)	(34.56)	(4.22)	(8.46)
Control mean	1,198.45	166.34	278.02	14.06	32.84
Control SD	830.10	154.24	216.27	27.00	80.29
p-values:					
$\beta_1 = \beta_2 = \beta_3$	0.080	0.030	0.102	0.121	0.819
$\beta_1 = \frac{1}{2}\beta_2 = \frac{1}{3}\beta_3$	0.399	0.928	0.131	0.301	0.375
No. of respondents	596	596	596	596	596
Observations	596	596	596	596	596

Note: Regressions include all observations collected from the phone surveys. Regressions include baseline measurement and strata fixed effects; for Malawi, regressions also include treatment indicators for market access and cash times market access. Results in the sub-panels on pooled and individual treatments are from separate regressions. Monetary outcomes are in USD PPP and winsorized at the 99th percentile. Standard errors clustered at the village level in parentheses.

Table A9: Intimate Partner Violence, Heterogeneity by baseline experience

	(1) Emotional IPV	(2) Physical IPV	(3) Sexual IPV	(4) Any IPV
Panel A. Liberia				
Cash × No IPV at baseline (β)	-0.10	-0.04	-0.04	-0.09
	(0.04)	(0.03)	(0.02)	(0.04)
Cash × Yes IPV at baseline (γ)	-0.06	0.07	-0.23	-0.03
	(0.14)	(0.15)	(0.18)	(0.13)
=1 if IPV at baseline	0.15	0.29	0.14	0.29
	(0.08)	(0.10)	(0.18)	(0.07)
Mean (Control × No IPV at baseline)	0.33	0.21	0.10	0.36
p-value ($\beta = \gamma$)	0.790	0.426	0.297	0.665
Observations	867	867	867	867
Panel B. Malawi				
Cash × No IPV at baseline (β)	0.01	-0.01	-0.00	0.01
	(0.01)	(0.01)	(0.01)	(0.02)
Cash × Yes IPV at baseline (γ)	-0.00	0.08	0.06	0.04
	(0.05)	(0.07)	(0.06)	(0.05)
=1 if IPV at baseline	0.15	0.07	0.07	0.16
	(0.04)	(0.04)	(0.04)	(0.04)
Mean (Control × No IPV at baseline)	0.11	0.06	0.06	0.15
p-value ($\beta = \gamma$)	0.830	0.185	0.299	0.518
Observations	1,829	1,829	1,829	1,829

Note: IPV is measured over the past year and using face-to-face interviewing. Regressions include strata fixed effects; for Malawi, regressions also include treatment indicators for market access and cash times market access. Standard errors clustered at the village level in parentheses.