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Savings defaults and payment delays for cash transfers: Field experimental evidence from Malawi☆

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ABSTRACT

Financial products and transfer schemes are typically designed to improve welfare by helping individuals follow through on their intertemporal plans. We implement an artefactual field experiment in Malawi to test the ability of households to manage a cash windfall by varying whether 474 households receive a payment in cash or through direct deposit into pre-established accounts at a local bank. Payments are made immediately, with one day delay, or with eight days delay. Defaulting the payments into savings accounts leads to higher net deposits into bank accounts, an effect that persists for a number of weeks afterwards. However, neither savings defaults nor payment delays affect the amount or composition of spending, suggesting that households manage cash effectively without the use of formal financial products.

1. Introduction

According to standard neoclassical theory, agents should be indifferent to the timing and modality of an expected windfall. In contrast, recent behavioral models suggest that both the timing and defaults have welfare implications. Quasi-hyperbolic preferences (Laibson, 1997) and dual-self models (Thaler and Shefrin, 1981; Fudenberg and Levine, 2006) predict that choices made in one period will be regretted in the next. There is not much direct empirical evidence about regret in the economics literature, but the data indicate that even extremely poor households spend substantially on non-food goods such as alcohol and tobacco. Banerjee and Duflo (2007) report that across 13 countries, food accounts for only 56 to 78 percent of total consumption for those living on less than USD 1.08 per person per day (1993 PPP adjusted). Although these extremely poor households suffer from poor health and malnutrition, some still devote considerable portions of their budget – five percent in India, six percent in Indonesia, and eight percent in Mexico – to tobacco and alcohol.

Empirical studies of access to finance often report spending on temptation goods as an outcome measure, with reduced spending considered a positive impact. For example, five of the six randomized evaluations of microcredit published in a recent special issue of the *American Economics Journal: Applied Economics* measure "discretionary spending" (defined as spending on temptation goods, recreation, entertainment, and celebrations) and report a decline in this spending category as one of the few consistent findings across the studies (Banerjee et al., 2015).

Related, time inconsistency can lead to suboptimal investments (Duflo et al., 2011) and undermine the ability to follow through on planned use of future income (Giné et al., Forthcoming). Financial products and transfer programs designed to address time inconsistency, however, have been successful in increasing asset accumulation and improving welfare (Ashraf et al., 2006; Dupas and Robinson, 2013a, 2013b). Thaler and Benartzi (2004) demonstrate the effect of default savings in a developed country context, while in developing countries, Aker et al. (2014) finds differences in the use of aid payments received via mobile money compared to those distributed in cash and Brune et al. (2016) shows that savings balances and subsequent investments increase sharply when agricultural proceeds are directly deposited into individual accounts. Blumenstock et al. (2015) find that paying employees of an Afghan cell phone company via

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mobile money shifts the composition of savings from informal methods to balance stored in the mobile money account, but does not significantly change total expenditures.

In some contexts, then, individuals face important barriers to saving for investment or smoothing consumption, and appropriately designed financial products can help overcome these barriers. However, there is also reason to question whether these products are always necessary. For example, tobacco farmers in Malawi did not benefit from the opening of a commitment savings account once a regular checking account was opened (Brune et al., 2016). Relatedly, entrepreneurs in Kenya failed to open savings accounts at an accessible local bank despite their apparently high returns (Dupas and Robinson, 2013a). More generally, and despite the oft-expressed concern by policy makers, there is little evidence that money from transfer schemes paid in cash is actually used for the purchase of temptation goods (Evans and Popova, 2014).

In order to learn whether savings defaults and the timing of transfers can be manipulated to improve welfare for households in Malawi, we implement an experiment varying the conditions under which 474 households receive a one-time, sixty dollar windfall.[1] Participants in our study either receive this large transfer in cash or deposited into their savings accounts. We vary whether the transfer is paid immediately, with one day delay, or with eight days delay.

Directly depositing income instead of paying in cash can affect savings and consumption through either transaction costs or psychological channels. Our study minimizes transaction costs by calling all respondents to the bank in order to receive the transfer. Thus, individuals whose money was directly deposited could withdraw it immediately, and conversely, those who received cash could deposit it. By equating the transactions costs across experimental arms, differences in savings and consumption can be attributed to one of two psychological channels: the default effect, a pervasive phenomenon responsible for differences in behavior ranging from savings (Thaler and Benartzi, 2004; Blumenstock et al., 2015) to organ donation (Johnson and Goldstein, 2003), and mental accounting (Thaler, 1999). Directly depositing money by default into the savings account may have signaled that the money was intended for saving rather than spending, causing respondents to treat money in the account as though it was to be used differently than cash on hand. We cannot distinguish between default effects and mental accounting, but we can separate these two behavioral explanations from transaction costs. Throughout the paper, we emphasize the psychological mechanism for the effect of direct deposit by referring to that treatment as creating a “savings default.”

Payment delays are used to test the presence of time inconsistency. Respondents with exponential discount rates should spend and save similarly whether they receive money immediately or with a short delay. However, those with quasi-hyperbolic preferences experience a discontinuous decrease in utility for all future periods, and are therefore expected to consume more when they receive transfers immediately than when their transfers are delayed. Savings defaults may mediate differences in consumption for immediate versus delayed payments through competing psychological channels.

The intervention takes place during the lean season when households may be most subject to temptation, and thus when nudges in the form of savings defaults or the ability to plan expenditures may be most relevant. Mani et al. (2013) show that economic scarcity by itself impedes cognitive performance in the lab and in the field as farmers perform worse on cognitive tasks during the lean season (pre-harvest) compared to the post-harvest period. Banerjee and Mullainathan (2010) develop a framework in which the poor are more susceptible to temptation spending than the rich. In their model, savings defaults or payment delays have the potential to arrest the temptation spending that would arise from windfall income received during the lean season.

We find that savings defaults do affect net deposits into bank accounts, and thus cash on hand. Those who initially receive cash, deposit MK 1,637 (6.5 percent of the total transfer) into their accounts, while those who are defaulted into saving, withdraw MK 17,937 (71.7 percent of the total) from their accounts. On average, net deposits are MK 3,400 higher in the savings default group (compared to the cash group) a week after the transfer. The impact of the savings default on savings is larger and more persistent for female respondents, compared to males.

Despite differences in cash-on-hand, transfer recipients with different savings defaults do not differ in their spending patterns in the weeks following the transfer. Total spending by the cash and direct deposit recipients differs by only MK 111 – less than one percent of the value of the transfer – in the week following the transfers. Food accounts for about one-third of total spending.

The overall spending patterns and the comparison between cash and savings default recipients refutes the notion that poor households cannot manage an unexpected cash windfall when income sources are limited. Unplanned expenditures account for less than five percent of total spending, and are not different between the cash and direct deposit recipients. Compared to those who do not receive large transfers, recipients do not spend all cash on hand: after two weeks, 85% of the amount transferred is not in the bank, but only 60% has been spent. Similarly, and in contrast to the predictions of a model with strict quasi-hyperbolic preferences, delaying payment by either one or eight days does not meaningfully affect subsequent consumption patterns. Importantly and as we argue in the paper, these null results are not due to limited statistical power.

Our finding that defaulting funds into savings account raises net deposits is consistent with existing behavioral economics research that savings defaults matter (Thaler and Benartzi, 2004). At the same time, we find little indication that respondents' well-being is affected by savings defaults or payment delays. Savings defaults may be a valuable tool for smoothing consumption and alleviating barriers to saving in some settings, such as bulky income from agriculture or other seasonal enterprises, or when habit formation is possible with repeat transfers like wages. However, our results indicate that even poor households facing high marginal utility of consumption during the lean season have some capacity to manage cash on hand.

Our paper thus contributes to the literature on the effect of savings defaults albeit in a specific context. We study a one-time transfer, precluding the opportunity for habit formation or learning which may be present in other savings schemes like Save More Tomorrow (Thaler and Benartzi, 2004). A key and novel feature is that the transaction costs of saving or dis-saving are equalized. Our experiment is thus a strict test of the direct psychological effects of defaults, abstracting from the effects that arise from the asymmetric transaction costs typically present in real-world settings.

We describe our experiment and results in more detail, as follows. Section 2 offers a detailed description of the intervention and timeline. Section 3 describes the data. Section 4 explains our analytical framework. We discuss the effect of savings defaults in Section 5, and the impact of delayed payment in Section 6. Section 7 concludes.

2. Experimental design

The windfall income experiment described in this paper is one of a set of interventions designed to encourage savings and understand the mechanisms through which formal bank accounts affect consumption and spending.[2]

[1] The transfer was MK 25,000, and was sufficient to purchase 50kg of maize, 10kg of beans, and two liters of cooking oil and is equivalent to relief payments made by Oxfam to flood victims in the region in early 2015. The exchange rate at the time of the transfer was MK 420 to USD 1, and the purchasing power parity adjusted exchange rate was MK 142 to the dollar.

[2] Other interventions include using labeled accounts and showing respondents a video designed to raise their aspirations about future welfare. Random assignment in the windfall experiment was orthogonal to these other interventions, and controlling for treatment group in other arms of the design does not affect the results in this paper.

Journal of Development Economics 129 (2017) 1–13

Crucially, the umbrella project offered subsidized bank accounts with the commercial bank NBS to households in villages located within six kilometers of the bank's Mulanje branch location.[3] The branch is located in the local trading center, an approximately one-kilometer stretch along the main road with shops, government offices, and branches of other local banks. The field teams completed village listings in ten villages and randomly selected 872 households for surveys and account offers in July 2012. Of those households, approximately five percent already had accounts with NBS and another 15 percent had accounts with one or more other banks. These numbers appear typical for Malawi. According to the nationally representative Global Findex Database, 18.8 percent of individuals aged 15 and older in Malawi had accounts with financial institutions in 2014; in rural areas, 14.3 percent of adults owned such accounts.

Ultimately, 742 individuals in our sample opened new accounts. The final sample included 704 new and existing NBS account holders who participated in the savings promotion studies. From that sample of account holders, a random subset of 600 were selected for the windfall cash experiment.

The windfall experiment varied whether respondents received a payment of MK 25,000 (USD 59.52 or $PPP 176.50) in cash or directly deposited into their bank accounts. The savings default treatment was cross-randomized with the timing of payment: immediately, after one day, or after eight days. In order to equalize the transactions costs of accessing the payment, all participants had to return to the bank in order to receive their payment whether it was made in cash or directly deposited into a bank account. Twenty percent of respondents (118 individuals) received a small, immediate cash payment of MK 1000 instead of the large transfer of MK 25,000 and serve as a control group although they are excluded from most of the analysis. Participants in the control group received a small payment to offset their travel and time costs and to preserve good will for participation in future survey waves. The final design thus includes six large transfer treatment arms that vary in savings default and timing of payment, and the control group. These groups are summarized in Fig. 1.

The randomization into the different treatment (and control) arms took place at the bank itself to avoid differential take-up. First, each head of household was visited by a field team for a midline survey, after which they were told they were eligible for a cash prize of up to MK 25,000 if they visited the bank branch exactly two days after the survey (which becomes “day zero” in the intervention timeline). In advance of the midline visit, households were randomly assigned (by computer, and stratified by village) to either a morning or afternoon visit to the bank branch. The shift implicitly determined whether the household would receive the transfer in cash or directly deposited into the bank account. The correspondence between shift time and savings default alternated daily, so respondents who interacted with each other at the bank all received the transfer in the same way. The savings default determination was not known to respondents until they visited the bank.

Assignment to disbursement timing took place at the bank. Respondents drew (without replacement) a token from a bag assigned to their village and bank shift.[4] The tokens corresponded to one of four groups: a control condition that received a small, immediate cash transfer or one of three timing conditions for the large transfers. The three timing conditions for the large payments were immediate, in one day, or in eight days. The savings default was cross-randomized and determined by pre-assignment to morning or afternoon shift as explained above, but was revealed to respondents following the token draw. From the respondents' perspective, the token draw determined whether the transfer was large or small; whether it was defaulted into savings; and when it was received.

[3] Individual household locations were measured via GPS, and could exceed 6 KM.

[4] Two villages were very small and thus morning and afternoon shifts drew from the same bag. One village was so small that it was combined with the immediately adjacent, larger village.

	Cash	Direct Deposit
Immediate	74	82
+1 day	79	79
+8 days	81	79

Fig. 1. Experimental design.

All analysis is conducted relative to the day a household was assigned to visit the bank. Follow up surveys were carefully timed to capture spending at key intervals. The recall period for each survey was one week. For those who received transfers immediately or one day after the initial bank visit, pre-transfer expenditures come from the survey conducted at the initial visit, on day $t = -2$ as indicated in Fig. 2. Spending in the week after the transfer (including day of the transfer) is measured in Survey 1, conducted on day $t = 7$ for the immediate-transfer group and day $t = 8$ for the one day delay group. For the eight day delay group, Survey 1 measures spending in the week after the announcement, but before the transfer was made. As we will discuss, households may spend in anticipation of receiving a large transfer. Survey 2, conducted on day $t = 15$, measures post-transfer expenditures for this group. The only exception to a one-week recall period is this survey, which includes an eight day recall period to capture spending on the day of the transfer.

Transfers were implemented in March and April 2014. They were timed to coincide with the end of the lean season, just before many households harvest and sell crops.

3. Data

The household survey described above is adapted from Malawi's Third Integrated Household Survey (IHS-3) and contains its detailed expenditure module. In addition to asking about the quantity purchased and total paid for 218 consumption goods, durable goods and services, we also ask whether each purchase was planned before the respondent arrived at the store or market, or was made on the spot.

We also use survey data collected between June and Aug 2013, before bank accounts were opened. These data include information about household demographics, expenditures, asset ownership and time preferences.

The top two panels of Table 1 provide summary statistics for variables collected at baseline in 2013 (Panel A) and during round 0 of the midline interviews just prior to the transfer experiment (Panel B). The majority of respondents are male. Sixty-three percent are married. Households have 4.7 members on average. Households own 1.5 acres of land on average and non-fixed assets worth MK 163,075 ($PPP 1148.41). During the 7 days leading up the round 1 interview, households spent a total of MK 9,601 ($PPP 67.61) on average, with MK 4,538 ($PPP 31.96) spent on food. Respondents reported spending an average of MK 405 ($PPP 2.85) on unplanned food purchases, and MK 122 ($PPP 0.86) on unplanned non durable items.

Our outcomes of interest are computed using administrative data from NBS and expenditures measured in the household surveys. We use NBS data to measure net deposits (a proxy for savings balances) at different points in time. Savings defaults could change spending patterns through mental accounting even if all money was immediately withdrawn, as long as direct deposit recipients still treated the transfer as funds to be saved for the future. More likely, though, savings defaults may influence use of the transfer through a flypaper effect, with some of the money remaining in the account even though there were very low transaction costs to withdrawing it immediately.[5] Therefore, we examine banking activity on the day of the transfer; within three days of the transfer; within seven days of the transfer; and within 14 days of the transfer. We consider three outcomes: with-

[5] Withdrawal fees are flat and do not depend on the amount of the transaction.

Fig. 2. Intervention and survey timing.

Table 1
Summary statistics.

	(1)Mean	(2)SD	(3)N	(4)5thpercentile	(5)10thpercentile	(6)Median	(7)90thpercentile	(8)95thpercentile
	Panel A: Baseline survey (June to August 2013)							
Male	0.66	0.47	474	0	0	1	1	1
Married	0.63	0.48	474	0	0	1	1	1
Number of hh members	4.71	2.19	474	2	2	4	8	9
Acres of land	1.47	1.18	474	0.40	0.50	1.15	2.75	3.50
Value of non-fixed assets (MK)	163,075	540,876	474	4,400	6,750	37,030	260,600	511,950
Asset index	−0.16	3.12	474	−3.10	−2.93	−1.08	3.48	6.16
Distance to branch (km)	3.70	1.72	474	1.26	1.61	3.64	6.36	7.08
Hyperbolic	0.23	0.42	474	0	0	0	1	1
Patient now, impatient later	0.26	0.44	474	0	0	0	1	1
Impatience (switching point, out of 6)	2.92	2.04	474	1	1	2	6	6
	Panel B: Savings and expenditures from round 1 survey							
NBS account	2,892	7,816	474	0	0	175	7,000	14,000
Formal savings	6,152	17,908	474	0	0	500	13,600	35,000
Informal savings	7,596	12,497	474	0	0	2,150	22,000	34,000
In-kind savings	14,436	42,040	474	0	0	0	35,000	60,000
Total financial assets	14,211	27,777	474	0	0	4,800	34,250	56,813
Total savings	29,128	57,980	474	0	0	8,975	65,000	129,000
Total expenditures	9,601	13,472	474	400	805	4,720	22,620	36,770
Food	4,538	5,409	474	210	470	2,595	10,715	16,050
Non-durables	1,688	2,513	474	20	80	725	4,620	7,400
Durables and investments	1,923	5,451	474	0	0	0	5,200	10,960
Transfers and fees	1,219	3,828	474	0	0	0	2,750	6,600
Unplanned food	405	807	474	0	0	60	1,250	2,050
Unplanned non-durables	122	435	474	0	0	0	250	800
	Panel C: Bank transaction before round 1 survey							
Any activity 7 days prior	0.08	0.27	474	0	0	0	0	1
Any activity 90 days prior	0.32	0.47	474	0	0	0	1	1
Value of deposits 90 days prior	13,768	118,506	474	0	0	0	10,000	40,000
Value of withdrawals 90 days prior	−16,496	191,205	474	−39,500	−9,500	0	0	0
Value of net deposits 90 days prior	−2,728	77,491	474	−1,889	−450	0	1,000	3,645

'Asset Index' is a principal component index based on 62 asset and seven livestock categories. The impatience measure is based on a series of questions asking whether the respondent would prefer MK 400 tomorrow or a different amount in one month. The choices increased as follows: MK 450, 500, 600, 800, 1000 or more. We report the ordinal number of the question for which the respondent preferred to wait; larger numbers indicate greater impatience. 'Non-durables' is the sum of spending on non-food non-durables. 'Durables' is the sum of spending on durable goods, assets, livestock and farm inputs. Withdrawals are represented as negative numbers. Exchange rate: MK 420 per USD, or MK 142 per $PPP.

Table 2
Balancing tests, cash transfer vs. savings default.

	Cash Transfer			Savings Default			P-value:
	Mean	SD	N	Mean	SD	N	Cash=SD
Panel A: Baseline survey (June to August 2013)							
Male	0.63	0.48	234	0.68	0.47	240	0.356
Married	0.62	0.49	234	0.63	0.48	240	0.957
Number of hh members	4.71	2.25	234	4.71	2.14	240	0.811
Acres of land	1.40	1.10	234	1.53	1.25	240	0.174
Value of non-fixed assets (MK)	194,543	663,336	234	132,395	384,826	240	0.176
Asset index	−0.12	3.18	234	−0.19	3.07	240	0.831
Distance to branch (km)	3.73	1.71	234	3.66	1.74	240	0.914
Hyperbolic	0.26	0.44	234	0.21	0.41	240	0.335
Patient now, impatient later	0.27	0.44	234	0.26	0.44	240	0.790
Impatience (switching point, out of 6)	2.94	2.06	234	2.89	2.02	240	0.790
Panel B: Savings and expenditures from round 1 survey							
NBS account	2,788	7,905	234	2,993	7,743	240	0.853
Formal savings	6,365	19,171	234	5,945	16,622	240	0.743
Informal savings	7,568	12,464	234	7,624	12,556	240	0.920
In-kind savings	13,699	41,418	234	15,155	42,712	240	0.675
Total financial assets	14,786	30,564	234	13,650	24,813	240	0.633
Total savings	29,758	62,122	234	28,514	53,760	240	0.848
Total expenditures	10,062	14,347	234	9,151	12,574	240	0.532
Food	4,877	6,159	234	4,208	4,549	240	0.219
Non-durables	1,700	2,504	234	1,676	2,527	240	0.821
Durables and investments	2,102	5,795	234	1,748	5,100	240	0.517
Transfers and fees	1,190	3,711	234	1,247	3,947	240	0.707
Unplanned food	418	770	234	392	844	240	0.865
Unplanned non-durables	128	411	234	116	458	240	0.939
Panel C: Bank transaction before round 1 survey							
Any activity 7 days prior	0.07	0.26	234	0.08	0.27	240	0.772
Any activity 90 days prior	0.33	0.47	234	0.32	0.47	240	0.793
Value of deposits 90 days prior	8,802	41,571	234	18,610	161,434	240	0.396
Value of withdrawals 90 days prior	−8,018	32,845	234	−24,761	266,764	240	0.353
Value of net deposits 90 days prior	784	13,998	234	−6,152	108,024	240	0.333

Reported p-values from test of equality of means in Cash and Savings Default groups based on regressions that include village and week-of-first-survey fixed effects mirroring the results specifications. 'Asset Index' is a principal component index based on 62 asset and seven livestock categories. The impatience measure is based on a series of questions asking whether the respondent would prefer MK 400 tomorrow or a different amount in one month. The choices increased as follows: MK 450, 500, 600, 800, 1000 or more. We report the ordinal number of the question for which the respondent preferred to wait; larger numbers indicate greater impatience. 'Non-durables' is the sum of spending on non-food non-durables. 'Durables' is the sum of spending on durable goods, assets, livestock and farm inputs. Withdrawals are represented as negative numbers. Exchange rate: MK 420 per USD, or MK 142 per $PPP.

drawals, deposits, and net deposits (deposits minus withdrawals).

In the period immediately preceding the intervention, respondents seldom use their accounts. Panel C of Table 1 shows that only 8% of respondents had any bank account transaction in the 7 days prior to round 0 survey collected just prior to respondent's first bank visit for this experiment. Thirty-two percent of respondents had at least one transaction in the 90 days prior to survey round 0. Deposits over the same period averaged MK 13,768 ($PPP 96.96) and net deposits were slightly negative on average. The standard deviation for deposit and withdrawals values reveals large sample variation, with a relatively small number of very large deposit and withdrawals. According to the Global Findex Database, in 2014, 71 percent of individuals in Malawi who owned accounts had made at least one transaction in the previous year.

To confirm that the randomization produced comparable experimental groups, we present two sets of balancing tests. Table 2 compares the means and standard deviations of baseline variables in the cash transfer treatment and the savings default treatment. The last column reports the p-value for the test that the means are equal, conditional on the village and week-of-survey fixed effects used in the subsequent analysis. There are no statistically significant differences for any of the baseline characteristics. Inspection of the data shows that the economically meaningful differences in asset ownership and in deposits and withdrawals in the 90 days before survey round 0 are driven by a few outlier observations, and the p-value for the test that the baseline variables jointly predict assignment to treatment is 0.948.

The second set of balancing tests reported in Table 3 are comparisons across the three transfer timing conditions. We report the p-value for the test of joint equality in the final column. There is a statistically detectable difference in one sub-category of spending, non-durables. There are also statistically significant ($p=0.044$) differences in the percent of each group that recorded any banking activity in the 90 days before the survey. Transactions were somewhat more likely in the 1-day delay group (0.39) than the immediate payment group (0.31) or 8-day delay group (0.26). Overall, we conclude that the randomization produced balanced treatment groups.

4. Analysis

The experiment is designed to address three related questions. Does defaulting payment of a transfer into a savings account affect savings? Is income used differently when directly deposited to a bank account compared to when received in cash? And does delaying receipt of the transfer change consumption and savings decisions?

Table 3
Balancing tests, payment delays.

	No Delay			1-day delay			8-day delay			P-value:equal means
	Mean	SD	N	Mean	SD	N	Mean	SD	N	
Panel A: Baseline survey (June to August 2013)										
Male	0.68	0.47	156	0.66	0.48	158	0.64	0.48	160	0.837
Married	0.64	0.48	156	0.61	0.49	158	0.63	0.48	160	0.788
Number of hh members	4.69	2.12	156	4.72	2.26	158	4.73	2.21	160	0.997
Acres of land	1.53	1.27	156	1.36	1.03	158	1.51	1.23	160	0.321
Value of non-fixed assets [MK]	158,794	532,003	156	200,520	670,851	158	130,273	384,059	160	0.521
Asset index	−0.16	3.14	156	−0.10	3.38	158	−0.21	2.83	160	0.936
Distance to branch [km]	3.70	1.72	156	3.62	1.70	158	3.77	1.75	160	0.138
Hyperbolic	0.23	0.42	156	0.27	0.45	158	0.20	0.40	160	0.263
Patient now, impatient later	0.21	0.41	156	0.28	0.45	158	0.30	0.46	160	0.240
Impatience (switching point, out of 6)	2.85	2.11	156	3.06	2.04	158	2.84	1.97	160	0.546
Panel B: Savings and expenditures from round 1 survey										
NBS account	3,071	8,338	156	2,952	8,003	158	2,658	7,114	160	0.899
Formal savings	6,021	17,833	156	5,490	15,412	158	6,935	20,208	160	0.747
Informal savings	7,357	11,639	156	7,682	12,372	158	7,744	13,466	160	0.920
In-kind savings	13,699	36,421	156	12,994	40,557	158	16,578	48,303	160	0.763
Total financial assets	14,358	28,691	156	13,546	24,834	158	14,723	29,718	160	0.917
Total savings	29,224	58,243	156	26,617	53,068	158	31,514	62,458	160	0.778
Total expenditures	9,749	12,736	156	9,081	14,582	158	9,970	13,092	160	0.893
Food	4,524	5,211	156	4,180	5,238	158	4,907	5,762	160	0.558
Non-durables	1,948	3,001	156	1,312	1,885	158	1,805	2,504	160	0.031
Durables and investments	2,033	5,368	156	1,695	5,626	158	2,041	5,383	160	0.869
Transfers and fees	1,348	3,728	156	1,402	4,659	158	912	2,910	160	0.316
Unplanned food	391	792	156	381	808	158	441	826	160	0.785
Unplanned non-durables	147	482	156	107	448	158	112	371	160	0.650
Panel C: Bank transaction before round 1 survey										
Any activity 7 days prior	0.06	0.25	156	0.09	0.29	158	0.08	0.26	160	0.803
Any activity 90 days prior	0.31	0.47	156	0.39	0.49	158	0.26	0.44	160	0.044
Value of deposits 90 days prior	19,716	195,064	156	13,611	48,415	158	8,125	47,994	160	0.719
Value of withdrawals 90 days prior	−30,058	328,547	156	−12,977	46,101	158	−6,748	33,821	160	0.566
Value of net deposits 90 days prior	−10,342	133,819	156	634	5,509	158	1,377	17,063	160	0.529

Reported p-values from test of equality of means in No-Delay 1-Day Delay and 8-Day Delay groups based on regressions that include village and week-of-first-survey fixed effects mirroring the results specifications. 'Asset Index' is a principal component index based on 62 asset and seven livestock categories. The impatience measure is based on a series of questions asking whether the respondent would prefer MK 400 tomorrow or a different amount in one month. The choices increased as follows: MK 450, 500, 600, 800, 1000 or more. We report the ordinal number of the question for which the respondent preferred to wait; larger numbers indicate greater impatience. 'Non-durables' is the sum of spending on non-food non-durables. 'Durables' is the sum of spending on durable goods, assets, livestock and farm inputs. Withdrawals are represented as negative numbers. Exchange rate: MK 420 per USD, or MK 142 per $PPP.

The experiment equated the transaction costs of accessing the transfer and to either saving or dis-saving. This is most obvious for those who received their transfers on the day they visited the bank, but we argue it is also true for those receiving transfers with one- or eight-day delays. In the delayed payment groups, respondents in the cash treatment arms had to return to the branch once to receive the full payment in cash. Those in the direct deposit treatment arms could replicate the same outcome – receipt of the full transfer in cash – for the same transaction cost of visiting the branch once. The costs associated with additional visits to the branch by individuals that chose not to withdraw the full amount of the transfer immediately cannot be attributed to how the transfer was made; instead, these are costs of using a bank account, and are incurred equally by anyone who may chose to save money at the bank. Direct deposit recipients could have delayed visiting the bank instead of coming on the day of the transfer, and in this sense, this flexibility may have reduced their costs of receiving the transfer relative to the cash groups. In practice, however, this flexibility was unimportant: 95 percent of the one day delay direct deposit group and 97 percent of the eight day delay direct deposit group withdrew money within the first week, and 84 and 86 percent, respectively, came to the bank on the same day the transfer is made. Thus, cash and direct deposit recipients each have the opportunity to receive the same amount of money by visiting the bank once, and they each incur the cost of a visit within a narrow window.

We first examine the impact of the savings default on bank transactions, using the administrative data described in the previous section. We compare outcomes for respondents who received MK 25,000 in cash to those who received the same amount deposited directly into their savings accounts, by estimating the following equation:

$$Y_i = \alpha + \beta \text{SavDef}_i + \delta \overline{Y_{i,t-90}} + \Gamma \text{Interview week}_i + \Theta \text{Village}_v + \epsilon_i \qquad (1)$$

The coefficient β measures the effect of the savings default (SavDef). We control for the average of the outcome variable in the 90 days prior to the transfer ($\overline{Y_{i,t-90}}$). The specification includes village and week-of-first-survey fixed effects, and has 80 percent power to detect changes of 0.2 standard deviations relative to the control group. Standard errors are robust to heteroskedasticity rather than clustered because randomization is at the individual level, a decision that is conservative in light of our emphasis on null results. We report results for each of the three outcomes – deposits, withdrawals, and net deposits – in four time horizons to observe whether there is a persistent effect of the savings default. Results for dependent variables are in levels of Malawi kwacha (MK) to facilitate the interpretation of the economic impor-

tance of treatments.

Next, we look at spending in several categories, one and two weeks after the transfer. Recall that expenditure data were collected before prizes were announced (survey round 1). Specifications incorporate the pre-treatment value of outcomes and fixed effects as in Eq. (1). For outcomes measured with survey data, we use OLS to estimate

$$Y_i = \alpha + \beta \text{SavDef}_i + \delta Y_{i0} + \Gamma \text{Interview week}_i + \Theta \text{Village}_v + \epsilon_i \tag{2}$$

separately using data one week after the transfer (Panel A) and two weeks after the transfer (Panel B). We collected two-week follow up data only for the subset of respondents who received transfers immediately or with one day delay, so the sample size in Panel B is smaller than in Panel A, and differences between the point estimates of coefficients in the two panels reflect both the difference in the sample and any change in the impact over time.

Finally, we study the effect of payment delay on expenditures. The dependent variable is expenditures one week post-transfer since using the two-week follow up data would preclude using the eight day delay treatment group. The specification we run is

$$Y_i = \alpha + \beta_1 \text{Delay1}_i + \beta_2 \text{Delay8}_i + \delta Y_{i0} + \Gamma \text{Interview week}_i + \Theta \text{Village}_v + \epsilon_i \tag{3}$$

with village and week-of-first-survey fixed effects and standard errors computed as in Eq. (2). This specification has 80% power to detect effect sizes of 0.28 standard deviations, and is therefore underpowered to detect smaller effects. Here, β_1 is the marginal effect of a one day delay compared to an immediate payment, while β_2 is the marginal effect of an eight day delay instead of immediate payment, averaged across cash and direct deposit treatments.

5. Savings default results

5.1. Administrative outcomes

Estimates of Eq. (1) test whether the savings default had any impact on immediate cash-on-hand. Since we argue that the transaction costs associated with receiving the full transfer in (or converting it to) cash were equal, the mode of payment should affect outcomes only through psychological channels. Differences in bank activity for cash compared to direct deposit recipients is sufficient (though not necessary) evidence that savings defaults matter.

Table 4, Panel A estimates the effect of windfall income and savings defaults on deposits. For recipients defaulted into saving, the total deposits of MK 25,089 (the sum $\alpha + \beta$, from column 1) on the day of the transfer is mechanical, and confirms that direct deposits were made as intended. Cash recipients deposited MK 1,637 ($PPP 11.56).[6] These immediate deposits account for 6.5 percent of the cash transfer. Columns 2–4 indicate some additional deposits over time among the cash recipients, but none by the direct deposit recipients.

Results in Panel B indicate that those defaulted into saving immediately withdrew most but not all of the transfer. On the day of the transfer, savings default recipients withdrew MK 17,937 more than cash recipients – in other words, they withdrew 72 percent of the transfer. As expected, cash transfer recipients' withdrawals were close to zero.

Panel C reports net deposits (changes in bank balances).[7] On the day of the transfer, recipients whose transfers were directly deposited into their accounts have net deposits that are MK 5,224 higher than the cash transfer group. Initially, then, the savings default induced recipients to keep 21 percent of their transfer in the bank. The total amount saved by the savings default group is nearly constant over the two weeks following the transfers. Because deposits increase for the cash recipients, the initial effect of the savings default is significant after seven days (column 3) but not after 14 days (column 4).

The initial differences in savings between participants who received transfers in cash compared to those defaulted into savings are striking because the experiment design ensured similar conditions for the two groups. Yet, despite minimal transaction costs, directly depositing the transfer into the account induced 4.3 times higher savings on the day of the transaction (Panel C, column 1) and 2.9 times more savings a week later (Panel C, column 3).[8]

In total, the cash transfer group averaged MK 5,524 ($PPP 39.00) more cash on hand on the day of the transfer, and MK 3,737 ($PPP 26.38) more one week later. The savings default treatment shifted assets to formal bank accounts and, as we show in the next section, away from other types of savings. This evidence of a positive effect of the savings defaults on bank savings motivates the examination of the composition of expenditures in the next subsection.

5.2. Household survey outcomes

Data from the household survey confirm that the savings default treatment shifted funds towards NBS bank accounts and away from other types of saving. We follow the structure of our survey instrument (adapted from the Malawi IHS-3) in categorizing savings as formal financial savings (accounts at NBS or other banks), informal savings (village savings groups, ROSCAs, and “cash kept at home or in a secret hiding place, that is not for daily living expenses”), and in-kind savings (advance purchase of farm inputs, business inventory, and bags of maize stored for later use). These three categories are mutually exclusive and exhaustive. For ease of comparison to the administrative data, the first column of Table 5 includes only savings in NBS accounts. Columns (2)–(4) are the three categories described above. Column (5) is total liquid savings, the sum of formal and informal savings, and column (6) is total household savings from all sources.

Directly depositing money into NBS accounts increases self-reported savings by MK 1,670 ($PPP 11.79) as measured one week after the transfers. The effect is smaller than in the administrative data, perhaps because the cash transfer group reports a higher level of savings at NBS than observed in the administrative data, but reflects the same trend: the savings default increases the amount of money in NBS accounts. Because we lack expenditure data after the transfer for the eight day delay group, Panel B has a smaller sample and thus results are not directly comparable to those using administrative data. Nonetheless, the magnitude of the effect of the savings default on NBS balances after two weeks is remarkably consistent with the administrative data.

Columns (2) to (6) show that the increase in money saved at NBS reflects a change in the composition rather than the total value of savings. Focusing on results after one week, where data for the full sample are available, we see that total savings in formal financial instruments rise by an amount comparable to the increase in savings at NBS (column 2), and that the change is more than offset by a decline relative to the cash transfer group in informal savings (column 3), which includes cash kept at home. In other words, the cash transfer group kept money at home while the savings default group kept it at the bank. In-kind savings is somewhat lower for those who received direct deposit, though the difference is not statistically significant (column 4). Most tellingly, the effect of the savings default on total savings in column (6), is small relative to the mean in the cash transfer group and not statistically different from zero. In fact, we reject that savings

[6] The purchasing power parity adjusted exchange rate in 2014 was 141.64MK/1 USD.

[7] We report net deposits rather than the level of bank balances due to a limitation of the administrative data obtained from NBS. In particular, NBS provided only the transaction history of each account since its opening.

[8] While the focus is on assessing the impact of default savings, we note that recipients of the large transfer compared to the control group saved a significant portion of the transfer in the bank for more than two weeks and that higher net deposits (relative to the control group) persist for 90 days after the initial transfer (result not shown).

Table 4
Effect of savings default on bank transactions.

	(1) Day of transfer	(2)+3 days	(3)+7 days	(4)+14 days
	Panel A: Deposits			
Savings Default	23452.552***	23680.378***	23932.107***	22586.859***
	(378.585)	(621.169)	(698.161)	(1256.521)
Observations	474	474	474	474
Mean of dependent variable in Cash group	1636.75	2190.82	2741.40	5122.17
R-squared	0.90	0.78	0.81	0.80
	Panel B: Withdrawals			
Savings Default	−17937.270***	−19966.633***	−20456.032***	−21086.793***
	(649.696)	(565.638)	(703.387)	(1264.565)
Observations	474	474	474	474
Mean of dependent variable in Cash group	−9.02	−254.79	−886.54	−2426.92
R-squared	0.68	0.81	0.75	0.50
	Panel C: Net Deposits			
Savings Default	5524.446***	3738.687***	3437.037***	1479.645
	(721.615)	(821.783)	(704.077)	(1057.334)
Observations	474	474	474	474
Mean of dependent variable in Cash group	1627.74	1936.03	1854.86	2695.25
R-squared	0.28	0.24	0.13	0.63

All specifications include village and week-of-first-survey fixed effects, and the value of deposits, withdrawals, net deposits, respectively, in the 90 days prior to survey 1. Withdrawals are represented as negative numbers. Exchange rate: MK 420 per USD, or MK 142 per $PPP. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5
Effect of savings default on savings.

	(1)NBSaccount	(2)Formalsavings	(3)Informalsavings	(4)In-kindsavings	(5)Total financialassets(2) +(3) + other	(6)Totalsavings(2)+(3) +(4) + other
	Panel A: One week after transfer					
Savings Default	1669.683**	1277.934	−3050.113**	−1112.016	−647.722	−908.143
	(828.824)	(1581.009)	(1238.233)	(3973.808)	(2366.426)	(4903.924)
Observations	474	474	474	474	474	474
Mean of dependent variable in Cash group	5576.86	8917.03	14849.70	22076.32	24347.50	47799.98
SD of dependent variable in Cash group	10141.54	21269.97	17075.07	48092.90	35367.95	73605.06
R-squared	0.30	0.34	0.39	0.33	0.46	0.50
	Panel B: Two weeks after transfer					
Savings Default	1691.103*	734.006	−925.735	−15013.889**	630.532	−15344.649*
	(1018.838)	(2090.709)	(1355.932)	(7626.461)	(2687.514)	(8935.366)
Observations	314	314	314	314	314	314
Mean of dependent variable in Cash group	5308.10	9429.67	11392.61	46683.69	20852.68	68490.62
SD of dependent variable in Cash group	8950.40	23826.40	17025.50	88591.66	37473.69	120342.79
R-squared	0.27	0.36	0.41	0.29	0.53	0.46

‘Formal savings’ is the sum of balances at NBS, any other bank or microfinance institution, and employee savings accounts. ‘Informal savings’ is the sum of balances in ROSCAS, village savings clubs, cash at home or in a secret hiding place, cash given to someone else for safe keeping. ‘In-kind savings’ is the sum of advance purchases of farm inputs, business inventory, bags of maize. ‘Other’ savings included in the totals in columns (5) and (6) are a small number of unclassified assets, with a mean value of MK 580.77. Panel A shows regressions with outcome variables measured one week after the transfer, Panel B uses the same outcomes measured two weeks after the transfer. The sample for Panel B is smaller since two-week follow-up data were only collected for respondents who received transfers immediately or with one day delay. All specifications include village and week-of-first-survey fixed effects, and the value of the outcome measured at survey 1. Exchange rate: MK 420 per USD, or MK 142 per $PPP. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6
Effect of savings default on expenditures.

	(1)Total	(2)Food	(3)Non-durables	(4)Durables	(5)Transfersand fees
	Panel A: One week after transfer				
Savings Default	110.674	743.611*	−262.969	−414.721	−83.273
	(1125.239)	(435.474)	(227.998)	(766.860)	(240.874)
Observations	472	472	472	472	472
Mean of dependent variable in Cash group	15149.95	5003.48	2414.48	6213.47	1233.89
SD of dependent variable in Cash group	12765.54	5204.55	2929.28	8295.42	2836.18
R-squared	0.25	0.24	0.22	0.10	0.12
	Panel B: Two weeks after transfer				
Savings Default	770.108	163.045	337.003	22.935	265.871
	(1111.960)	(427.687)	(239.114)	(697.530)	(228.800)
Observations	312	312	312	312	312
Mean of dependent variable in Cash group	8751.50	3920.65	1378.50	2830.26	640.00
SD of dependent variable in Cash group	10331.99	4660.08	1997.26	5699.57	1835.09
R-squared	0.30	0.35	0.25	0.20	0.07

'Non-durables' is the sum of spending on non-food non-durables. 'Durables' is the sum of spending on durable goods, assets, livestock and farm inputs. 'Transfers and fees' is the sum of spending on ceremonies, funerals, school fees, loans given, formal insurance, fines and fees. Panel A shows regressions with outcome variables measured one week after the transfer, Panel B uses the same outcomes measured two weeks after the transfer. The sample for Panel B is smaller since two-week follow-up data were only collected for respondents who received transfers immediately or with one day delay. All specifications include village and week-of-first-survey fixed effects, and the value of the outcome measured at survey 1. Exchange rate: MK 420 per USD, or MK 142 per $PPP. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

defaults either increase total savings by more than 0.12 standard deviations or decrease them by more than 0.14 standard deviations relative to the cash treatment group.

While total savings did not change, the mix of formal and informal savings did. We examine expenditures to learn whether savings defaults affect welfare by changing consumption patterns.

We are interested in the magnitude and composition of expenditures by cash and savings default recipients. Table 6 reports spending in total and on four mutually exclusive and exhaustive categories: food, non-durables, durable goods, and transfers and fees.[9] We find that in the first week after the transfer, people who received cash spent an average of MK 15,150 ($PPP 106.96) across all categories. Those who were paid by direct deposit spent MK 111 ($PPP 0.78) more, a difference that is neither economically nor statistically significant. The savings default increased spending on food by MK 744 ($PPP 5.25), or 15 percent of spending by the cash transfer group. Spending in other categories fell by small amounts.

Recall that the maintained null hypothesis is that savings defaults reduce spending. The 95 percent confidence interval for the estimated effect of the savings default excludes reductions in total spending of more than MK 2,095 ($PPP 14.79), which is 8.4 percent of the total transfer, 13.8 percent of spending in the same time period by the cash transfer group, or 0.16 standard deviations (relative to spending by the cash transfer recipients). The top portion of Fig. 3 illustrates the magnitude of the effect of the savings default on categories of spending in purchasing power parity adjusted dollars. For each outcome, we report the mean spending in the cash group, the mean spending in the savings default group, and the regression-adjusted difference between the two (the estimate of β from Eq. (2)). Whiskers indicate the 95 percent confidence interval for the effect of the savings default.

One can also compare the magnitude of the effect to that found in other studies of savings defaults. Thaler and Benartzi (2004) report

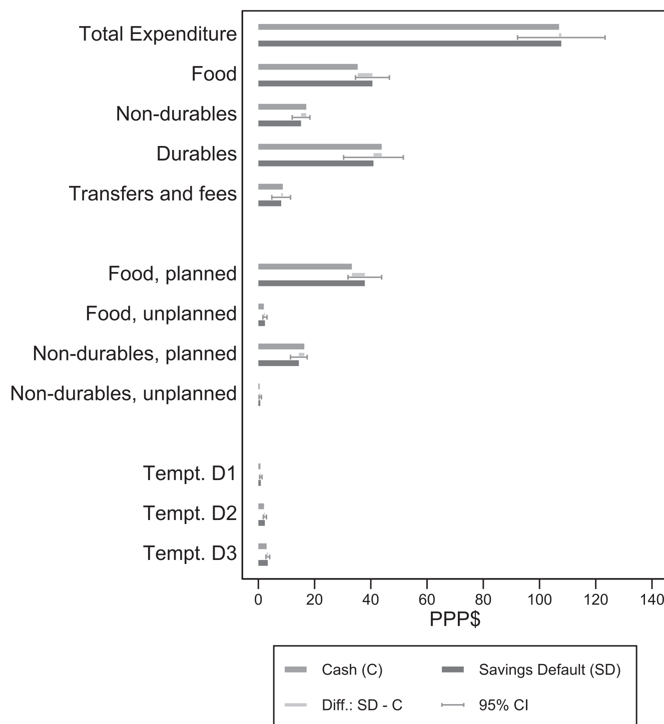

Fig. 3. Effect of savings default on expenditures, Bars correspond to mean expenditures in cash and savings default groups, respectively. The effect of the savings default is represented in light gray and displayed between spending for the cash and savings default groups for each outcome variable. Whiskers indicate the 95 percent confidence interval for this treatment effect, estimated from Eq. (2). Outcomes in the top panel sum are mutually exclusive and sum to total expenditures. Outcomes in the middle panel sum to consumables (food plus non-durables). See Table 6 for additional notes, and Appendix Tables A1 and A2 for regression analogs to the results in the middle and bottom panels. All values are reported in 2014 PPP adjusted dollars.

[9] Transfers and fees include spending on ceremonies, funerals, school fees, loans given, formal insurance, fines, and government fees.

savings rates (contributions to retirement accounts as a percent of wages) but not expenditures. But two more recent papers measure expenditures in ways that are comparable to our outcomes. Blumenstock et al. (2015) measure expenditures six to eight months after Afghani employees are switched to mobile wage payments and find that total expenditures *increase* by 27.8 percent of the control group mean (not statistically significant), and food expenditures increase by 42.1 percent (significant at the 5 percent level). Both of these increases are outside our confidence interval and in the opposite direction of our hypothesis. Because they measure outcomes after workers have adjusted to a new payment system, they can however be interpreted as tentative evidence of positive welfare impacts of mobile payments. Somville and Vandewalle (2015) reward Indian households either in cash or directly into basic savings accounts for answering detailed weekly surveys. Like us, they anticipate that savings defaults may reduce short term spending. They find that the savings default decreases spending on food and non-durables by 11.6 percent of spending in the cash payment group. We find that spending on food actually increases in the week following the transfer, with reductions of more than 2.2 percent of the cash group mean for food spending falling outside the confidence interval.[10]

If cash transfer recipients purchase durable goods as an alternative to saving in the bank or keeping cash at home, then changes in total expenditures might understate the effect of the savings default. However, we see no evidence of differential spending on durable goods. This works against the hypothesis that either the savings default nudged people to "save" through purchase of durable goods, or that the cash transfer recipients substituted towards durable purchases as a smoothing strategy.

Estimated effects after two weeks are less precise, because only the 314 respondents[11] who received transfers with no or one day delays were surveyed twice after the transfer. In this sample, there is no evidence that the savings default reduced spending. If anything, total spending was higher by MK 770 ($PPP 5.44, or 8.8 percent) in the savings default group compared to the cash group, and reductions of more than MK 1,409 ($PPP 9.95) or 5.6 percent of the value of the transfer fall outside the 95 percent confidence interval. The savings default group spent more than the cash transfer group on each of the four components of spending, but none of the differences were statistically significant and all were small relative to either the mean or the standard deviation in the cash group.

Comparing spending by cash or direct deposit recipients to those in the control group (who received MK 1,000) helps explain why the savings default did not reduce total spending. Recipients of the large cash transfers had nearly MK 23,000 ($PPP 162.38) more cash on hand than the control group, but they spent less than half of the windfall during the first week and only 58 percent after two weeks.[12] Savings default recipients had slightly less cash on hand initially and spent slightly more after two weeks, but both groups spent about half of a transfer (equivalent to one month's food costs) in two weeks, and both groups had considerable amounts of unspent cash that was not in the bank. This is clear evidence of intertemporal smoothing, and evidence that households can overcome short-term constraints to saving without using bank accounts.

A second test of households' ability to manage cash is presented in the middle of Fig. 3, which disaggregates total spending on consumables in the week following the transfer into planned and unplanned purchases. If saving in the bank protects against temptation spending, one would expect to see more unplanned expenditures for the cash transfer group than the savings default group. Instead, we see extremely low levels of unplanned spending in either group, and no economically meaningful or statistically significant differences between the two.

Only consumable expenditures (food and non-durables) were categorized as planned or unplanned, because piloting of the survey instrument indicated that durable purchases were rarely "unplanned." In the week after the transfer, consumables account for 49 percent of spending by cash transfer recipients and 52 percent by those in the savings default treatment. As illustrated in the middle panel of Fig. 3, unplanned purchases are only a small share of these purchases.[13] In the cash treatment, MK 278 ($PPP 1.96) or 5.6 percent of food purchases were unplanned, while in the direct deposit group, MK 332 ($PPP 2.34) or 5.8 percent were unplanned. Neither the amounts nor the shares are significantly different between the two treatment groups. Unplanned spending on non-durables is also small in economic terms and not statistically different between the two treatment groups. Unplanned spending remains trivial in the second week after the transfer, with no significant effects of the savings default treatment.[14]

Analyzing planned and unplanned expenditures avoids categorizing some goods as "temptation" goods, but for consistency with the existing literature, we also analyze spending on specific items that provide short-term utility with potential long-term costs. We use several different definitions of temptation goods in the bottom panel of Fig. 3: alcohol and tobacco (D1); D1 plus fats and sugars (D2); and D2 plus prepared foods sold by vendors (D3). Total spending on temptation goods is low by any definition, and there are no differences that depend upon savings defaults measured in the week after the transfer.[15] The difference in spending is always less than USD 1, and accounts for one percent or less of the total transfer.

Together, the patterns documented in Fig. 3 present compelling evidence of intertemporal smoothing and the ability to resist temptation or pressure to spend money immediately upon receiving a large windfall. These findings are strengthened by the fact that the transfers are made during the lean season when the marginal utility of consumption is high.

6. Payment delay results

We cross-randomize the savings default treatments with zero-, one-, and eight-day delays in transfers to test for time inconsistency and ability to plan. Quasi-hyperbolic discounters would be more likely to spend, and to succumb to temptation spending if they received money immediately. In a true test of quasi-hyperbolic discounting, a one day delay would have a meaningful effect on expenditures, but there would be minimal difference between a one day and an eight day delay. If instead delays operate through planning rather than discounting, those required to wait eight days for their payments have greater opportunity to plan their purchases. Planning does not necessarily affect overall spending, though it may reduce the tendency towards temptation spending or facilitate bargaining or comparison shopping that lowers purchasing price.

We estimate the effect of payment delays using Eq. (3). The reference group received transfers immediately. Since outcomes are measured in time relative to the receipt of the transfer, the delays by definition also change the timing of the outcome. Outcomes are measured only one week apart, but at the end of the lean season when food stocks are near depletion, it is plausible that there is some

[10] Our confidence interval for non-durables is wider. Reductions of more than 29.4 percent of cash-recipient spending fall outside the confidence interval. Somville and Vandewalle (forthcoming) do not report expenditures separately for food and non-food items, but in our sample, expenditures on food is approximately twice as those on non-durables.

[11] Expenditure data are missing for two of these respondents.

[12] Results available upon request.

[13] Corresponding regression results are available in Appendix Table A1.

[14] See results in Appendix Table A1.

[15] Two weeks after the transfer, the savings default group appears to spend *more* than the cash transfer group on alcohol and tobacco, and the difference carries over to some of the more inclusive measures. See Appendix Table A2 for regression results for expenditures one and two weeks post transfer.

Table 7
Effect of delayed transfers on expenditures.

	(1)Total	(2)Food	(3)Non-durables	(4)Durables	(5)Transfersand fees
1-day delay	735.111	−254.224	725.832**	375.094	−77.818
	(1343.973)	(510.050)	(281.049)	(888.467)	(329.711)
8-day delay	−1042.097	−189.175	3.378	−26.334	−713.099**
	(1260.499)	(552.714)	(249.935)	(942.140)	(288.540)
Observations	472	472	472	472	472
Mean of dependent variable in Immediate group	15318.73	5337.47	2139.36	5959.10	1515.09
SD of dependent variable in Immediate group	14635.63	5392.90	2552.21	9019.54	3145.75
R-squared	0.253	0.240	0.232	0.097	0.135
P-value: 1 day delay = 8 day delay	0.179	0.906	0.014	0.660	0.013

'Non-durables' is the sum of spending on non-food non-durables. 'Durables' is the sum of spending on durable goods, assets, livestock and farm inputs. 'Transfers and fees' is the sum of spending on ceremonies, funerals, school fees, loans given, formal insurance, fines and fees. All specifications include village and week-of-first-survey fixed effects, and the value of the outcome measured at survey 1. Exchange rate: MK 420 per USD, or MK 142 per $PPP. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

seasonality in expenditures that affects our results.

Table 7 reports estimates of Eq. (3) for spending in total and on the four categories described above, during the week following the transfer; the same estimates are presented graphically, in purchasing power parity adjusted dollars rather than Malawian kwacha, in the top panel of Fig. 4.

Overall, delays have little effect on spending. The immediate transfer group spent an average of MK 15,314 ($PPP 108.12) in the following week. A one day delay increased total spending by MK 735 ($PPP 5.19), and an eight day delay decreased total spending by MK 1,042 ($PPP 7.36). Neither change is statistically significant, and though the point estimates have opposite signs, we cannot reject that the effect of the one day delay is equal to that of the eight day delay. The lower bound of the 95 percent confidence interval (that is, the largest spending reduction we fail to reject) for the one day delay is MK −1899 ($PPP −13.41), and for the eight day delay is MK −3513 ($PPP −24.80).

There are some shifts in the composition of spending, though none that follow a clear pattern. The one day delay increased spending on non-durables relative to either the immediate or eight day delay group, and the eight day delay decreased spending on transfers and fees.

In the middle panel of Fig. 4, we break spending into planned and unplanned categories.[16] As mentioned, planned spending accounts for the majority of both food and non durable purchases. Recipients of immediate transfers spent MK 4,991 ($PPP 35.24) on planned food purchases. Those whose payments were delayed by one day spent slightly less and those whose payments were delayed by eight days, slightly more. Unplanned food expenditures were small for all three treatment groups. The eight day delay group spent MK 183 ($PPP 1.29) less than the immediate payment group (significant at the 10% level) and MK 233 ($PPP 1.65) less than the one day delay group (significant at the 5% level). The immediate payment group spent MK 2,470 ($PPP 17.44) on non-durables. Those whose payments were delayed by one day spent MK 586 ($PPP 4.14) more than the immediate payment group, a difference that is significant at the five percent level. Planned non-durable spending in the eight day delay group was almost identical to the immediate payment group. Unplanned spending on non-durable items is very low in all three groups.

Those who receive the transfer unexpectedly and without warning are no more likely to spend it, and do not spend it substantially differently, than people who receive advance notice of the transfer. As with the previous comparisons between cash transfers and direct deposit, this is a remarkable finding especially during the lean season, when marginal utility of consumption is likely highest and when individuals may be most subject to temptation (Banerjee and Mullainathan, 2010; Mani et al., 2013).

In addition, these results indicate that the null findings are not the result of limited statistical power in the analysis. Indeed, the differences in unplanned expenditures across treatment and control arms are statistically significant but not economically meaningful, indicating that we have sufficient power to detect small differences in the

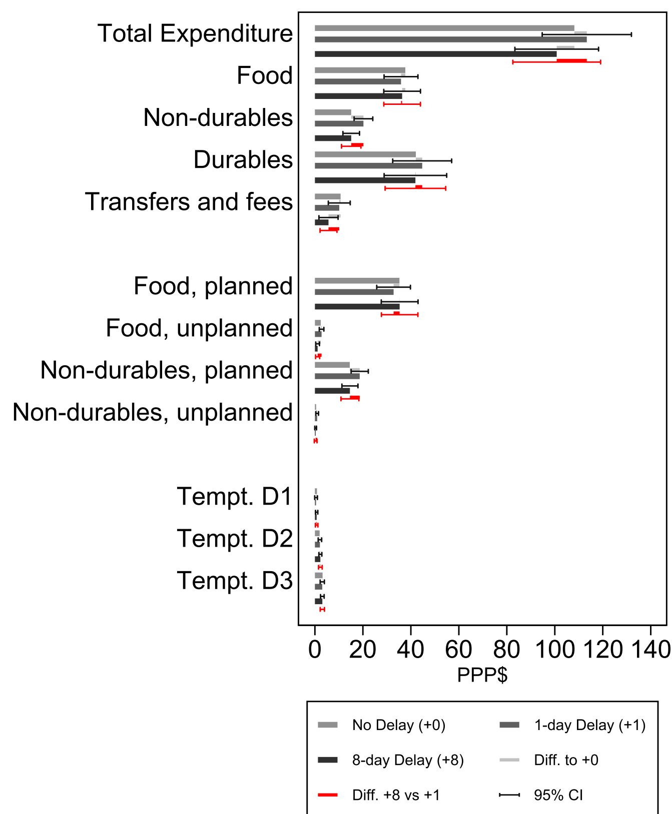

Fig. 4. Effect of delayed transfers on expenditures, Bars correspond to mean expenditures in immediate, one-day, and eight-day delayed payments, respectively. Light gray bars above the one-day and eight-day group means indicate differences between the immediate payment group and the respective delayed payment group. The red bar at the bottom of each set of outcomes indicates the difference between the one-day and eight-day delay groups. Whiskers indicate the 95 percent confidence interval for these treatment effects, estimated from Eq. (3). Outcomes in the top panel sum are mutually exclusive and sum to total expenditures. Outcomes in the middle panel sum to consumables (food plus non-durables). See Table 7 for additional notes, and Appendix Tables A1 and A4 for regression analogs to the results in the middle and bottom panels. All values are reported in 2014 PPP adjusted dollars.

[16] The corresponding regression output is available as Appendix Table A3.

outcomes of interest.

As in Section 5.2, we also analyze the effect of payment delays on the level and expenditure share devoted to so-called "temptation" goods. The bottom panel of Fig. 4 presents these results.[17] Total spending on temptation goods in the week following a large windfall transfer is less than $PPP 3.25 by any definition, and neither one- nor eight-day delays in payments significantly affect spending on these goods.

7. Conclusion

Depositing a one-time transfer directly into a savings account (savings default) compared to providing the transfer in cash leads to higher savings for transfer recipients in subsequent weeks. However, we find no evidence that either savings defaults or informing the recipient about the transfer in advance (delayed payment) affected respondents' consumption patterns. Households that received lump sum transfers during the lean season are able to smooth intertemporally without use of formal financial products, and report very low levels of unplanned spending. Formal financial products may be more important in other contexts: at different points in the year, for recurring payments, for earned income, or for different payment amounts.

The savings default we study differs in one crucial dimension from those in previous work: it virtually eliminates the transaction cost to undo the default. All participants come to the bank in order to receive their transfers; those who receive direct deposit need only walk through the bank door to withdraw funds, and those who receive cash can do the same to make a deposit. In contrast, changing automatic contributions to a retirement plan requires requesting and completing new benefit deduction forms, and increasing savings by making deposits from wages requires either a trip to the bank or logging on to the bank's website to make a transfer (and forgoing the tax advantages of pre-tax contributions). If defaults affect behavior because psychological costs are amplified by small time or monetary costs of accessing directly deposited funds, then they will be ineffective in a setting when the transaction costs are equalized.

There are other potential explanations for our findings. Nutritional deprivation leading to very high marginal utility of consumption of food could explain the low levels of temptation spending observed, but in our study very little of the transfer is spent on food. This is consistent with the behavior of very poor households studied by Banerjee and Duflo (2007), who report considerable non-food expenditures despite very low incomes, and with recent findings that income earned through Malawi's public works program (PWP) does not improve nutrition (Beegle et al., 2017).

We study a one-time transfer, which limits the opportunity for habit formation. Somville and Vandewalle (forthcoming) study recurring transfers by paying Indian survey participants the equivalent of a daily wage for 7 to 13 weeks. They vary whether payments are in cash or through individual accounts with local banks, and find lower food consumption and nearly-equivalent higher savings for those paid through bank accounts. However, the effect dissipates as soon as payments are switched to cash. This works against the hypothesis that habit formation or learning is an important mechanism or a reason that our results would underestimate the impact of recurring direct deposits.

The transfers in our study are unearned and unanticipated. Previous work in Malawi shows that direct deposit of earned agricultural income does affect savings, investment, and consumption in the following year (Brune et al., 2016). In other studies of access to bank accounts, deposits come from the subjects' own assets or income (Dupas and Robinson, 2013a). Mental accounting could lead to different use of earned and unearned income, and to different effects of payment structure on earned income than what we measure, for unearned income. Blumenstock et al. (2015) find imprecise increases in spending six to eight months after wage payments for Afghani workers are converted to mobile money instead of in cash.

Similarly, payment delay does not affect the level nor composition of expenditures in our study, but it may in other contexts. While there is evidence that direct deposit does affect spending and investment for earned income, the evidence on payment frequency or delay is less conclusive. In Malawi, paying public works beneficiaries every three days compared to every week does not affect consumption (Beegle et al., 2017), but paying participants in an NGO's livelihood program monthly instead of weekly reduces total short-run spending and increases take up of a high yield short term investment opportunity (Brune and Kerwin, 2017). In Indonesia, unanticipated delays to planned disbursements of a government-sponsored unconditional cash transfer reduced consumption growth of beneficiaries relative to non-beneficiaries as well as to those who received payments on schedule (Bazzi et al., 2015).

Previous studies have established that financial access and savings defaults can change savings and investments, and our results do not contradict those findings. Rather, they suggest limits to the impact of or need for formal financial products to manage cash. Future research should identify situations in which savings defaults and other financial products are most likely to be effective in combating behavioral biases that lead to spending that is later regretted, and that an appreciation of the ability to manage cash will prevent unnecessary rigidities or complexities in the design of wage payments or cash transfers.

Appendix A. Supplementary data

Supplementary data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.jdeveco.2017.06.001.

References

Aker, Jenny, Boumnijel, Rachid, McClelland, Amanda, Tierney, Niall, 2014. Payment mechanisms and anti-poverty programs: evidence from a mobile money cash transfer experiment in Niger. Cent. Glob. Dev. Work. Pap., 268.

Ashraf, Nava, Karlan, Dean, Yin, Wesley, 2006. Tying Odysseus to the Mast: evidence from a commitment savings product in the Philippines. Q. J. Econ. 121 (2), 635–672.

Banerjee, Abhijit, Duflo, Esther, 2007. The economic lives of the poor. J. Econ. Perspect. 21 (1), 141–168.

Banerjee, Abhijit, Sendhil, Mullainathan, 2010. The Shape of Temptation: Implications for the Economic Lives of the Poor. NBER Working Paper No. 15973.

Banerjee, Abhijit, Karlan, Dean, Zinman, Jonathan, 2015. Six randomized evaluations of microcredit: introduction and further steps. Am. Econ. J.: Appl. Econ. 7 (1), 1–21.

Bazzi, Samuel, Sudarno, Sumatro, Asep, Suryahadi, 2015. It's All in the Timing: Cash Transfers and Consumption Smoothing in a Developing Country. Journal of Economic Behavior and Organization, 119, pp. 267–288.

Beegle, Kathleen, Emanuela, Galasso, Jessica, Goldberg, 2017. Direct and Indirect Effects of Malawi's Public Works Program on Food Security. Journal of Development Economics, 128, pp. 1–23.

Blumenstock, Joshua, Michael, Callen, Tarek, Ghani, 2015. Mobile-izing Savings: Experimental Evidence on the Impact of Automatic Contributions in Afghanistan. Work in progress, presentation at IPA and Yale University Researcher Gathering on Financial Behavior.

Blumenstock, Joshua, Michael, Callen, Tarek, Ghani, Lucas, Koepke, 2015. Promises and Pitfalls of Mobile Money in Afghanistan: Evidence from a Randomized Control Trial. Working Paper, University of Washington.

Brune, Lasse, Jason, Kerwin, 2017. Income Timing, Temptation and Expenditure: A Field Experiment in Malawi. Working Paper.

Brune, Lasse, Xavier, Giné, Jessica, Goldberg, Dean, Yang, 2016. Facilitating Savings for Agriculture: Field Experimental Evidence from Malawi. Economic Development and Cultural Change.

Duflo, Esther, Kremer, Michael, Robinson, Jonathan, 2011. Nudging farmers to use fertilizer: theory and experimental evidence from Kenya. Am. Econ. Rev. 101 (6), 2350–2390.

Dupas, Pascaline, Robinson, Jonathan, 2013a. Savings constraints and microenterprise development: evidence from a field experiment in Kenya. Am. Econ. J.: Appl. Econ. 99 (2), 163–192.

Dupas, Pascaline, Robinson, Jonathan, 2013b. Why don't the poor save more? Evidence from health savings experiments. Am. Econ. Rev. 103 (4), 1138–1171.

Evans, David, Anna, Popova, 2014. Cash Transfers and Temptation Goods: A Review of

[17] Regression analogs are available as Appendix Table A4.

Global Evidence. World Bank Policy Research Working Paper WPS6886.
Fudenberg, Drew, Levine, David, 2006. A dual-self model of impulse control. Am. Econ. Rev. 96 (5), 1449–1476.
Giné, Xavier, Jessica, Goldberg, Dan, Silverman, Dean, Yang. Forthcoming. Revising Commitments: Field Experimental Evidence on Adjustment of Prior Choices. Economic Journal.
Johnson, E.J., Goldstein, D.G., 2003. Do defaults save lives? Science, 1338–1339.
Laibson, David, 1997. Golden eggs and hyperbolic discounting. Q. J. Econ. 112, 443–447.
Mani, Anand, Mullainathan, Sendhil, Shafir, Eldar, Zhao, Jiaying, 2013. Poverty impedes cognitive function. Science 341 (6149), 976–980.
Somville, Vincent, Lore, Vandewalle, 2015. Saving by Default: Evidence from a Field Experiment in Rural India, with Vincent Somville, forthcoming at American Economic Journal: Applied Economics.
Thaler, Richard, Benartzi, Shlomo, 2004. Save more tomorrow: using behavioral economics to increase employee saving. J. Political Econ. 112 (2), S164–S187.
Thaler, Richard, Shefrin, H.M., 1981. An economic theory of self-control. J. Political Econ. 89 (2), 392–406.
Thaler, Richard, 1999. Mental accounting matters. J. Behav. Decis. Mak. 12, 183–206.