Payment Delays for Cash Transfers: The Role of Subsistence Constraints

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Abstract

The role of cash transfer programs in enhancement of household welfare can hardly be overemphasized. In the design of these programs, timing of transfers is one important consideration as anticipation time may allow for planning as postulated by the mental accounting model. I suggest a theoretical modification of the mental accounting model to introduce the role of subsistence constraints in the impact of payment delays for cash transfers. I, further, empirically examine existence of such heterogeneity in impact within a developing country context. I use existing data from a field experiment implemented in Malawi and find evident heterogeneity in the impact of payment delays such that delay raises savings more for wealthier households, pointing to the need for cash transfer programs to cater for these disparate characteristics among potential beneficiaries.

JEL Classification: D11, D12, D14, D15

Keywords: Payment delays, Cash transfers, Subsistence constraints, Mental accounting, Lab-in-the-field experiment, Malawi.

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1 Introduction

The role of financial inclusion in improving household welfare has been widely documented[1]. Among others, financial inclusion is expected to work by improving investments in human capital, promoting growth of businesses, smoothing household incomes and providing a cushion in times of emergencies. Yet, access to and use of financial services remains very low in developing countries especially those in the sub-Saharan African (SSA) region - with only a fifth of adults in low-income countries saving through formal financial institutions, compared to half of adults in high-income countries (Demirgüç−Kunt et al., 2018). In a bid to improve financial inclusion, governments, development partners and financial institutions have employed disparate strategies, including adoption of digital technologies, financial literacy, group saving and saving commitment schemes (see Steinert et al. (2018) for a systematic review of the literature). A key policy that has also been employed in the developing country context and has gained burgeoning interest in recent years is cash transfers or windfall payments. In the literature, there is an agreement that cash transfers or windfall payments have positive impacts on household economic outcomes, including savings and investment[2]. Even so, the design of cash transfer programs in terms of how and how much windfalls are given is still subject of much debate (see Baird et al. (2014) and Bastagli et al. (2016) for issues such as transfer conditionality, frequency, size, recipient type, and criticality of receiving time). One particular issue that remains unresolved has to do with anticipation; that is, whether information about future incomes, as well as timing delays, could affect saving and spending decisions or not.

As first presented by von Neumann and Morgenstern (1947, p. 8) in the fundamental economic assumption of fungibility, traditional economic theory postulates that money is unrestrictedly substitutable and freely transferable with whatever utility is demanded by economic agents. This implies that, rationally, economic agents make consumption and saving decisions in space without regard for the source of money. Also, the life-cycle hypothesis (Modigliani and Blumberg, 1954; Modigliani, 1966) and the permanent income hypothesis (Friedman, 1954) argue that economic agents save or dissave at any point in time, based on current and anticipated incomes, as they strive to attain smooth consumption overtime. In this case, unanticipated changes in income are expected to trigger higher responses. These predictions should work for cash transfers or windfall payments, just like for any other incomes. However, the predictions have been challenged in more collectivist societies where, for example, more active members of the society assume responsibility for older and less active members (Roberto and Jarrott, 2008); and saving in such societies - as is the case with developing countries in general - is associated with palpable supply-side constraints

[1] See Breza and Kinnan (2021), Hendriks (2019), Dupas et al. (2018), Demirgüç−Kunt et al. (2017), Suri and Jack (2016), Jack and Suri (2014), among others.

[2] For savings and investment, see Stoeffler et al. (2020), Angelucci et al. (2012) and the systematic review on impacts of cash transfers or windfall payments by Kabeer and Waddington (2015), for example.

(such as lack of attractive saving channels - including formal institutions) and demand-side constraints (such as distrust in the system and lack of information)[3]. In addition, the theory has been challenged by the existence of a number of behavioral anomalies - albeit to varying extents - which has seen a surge in studies on the same, including spending on temptation or demerit goods (see Evans and Popova (2017), Brune et al. (2022) and Banerjee et al. (2015)), time inconsistency (see Jones and Mahajan (2015) and Wong (2008)) and reference dependence. In terms of reference dependence, saving decisions may vary based on the saving targets set at any point in time, with agents having a distaste for falling short of target and low marginal utility for above-target savings - conveying a utility function that is strongly concave around the target (Narasimhan et al., 2005).

In light of such anomalies, one notable theoretical contribution is by Shefrin and Thaler (1988) in the theory of mental accounting which argues that economic agents create mental accounting systems to manage their savings and consumption decisions. The mental accounts that agents cognitively create serve as self-control devices as people strive to control expenditure and improve saving. Particularly, the theory postulates that economic agents transfer income streams into current income, current assets and future income based on the size and anticipation time of the windfalls. But, are the three mental accounts ubiquitous for wealthy economic agents and poor economic agents - or within more developed and less developed country contexts - alike? One key limitation with this theory is that it does not consider the role of subsistence constraints - which are prominent in developing country contexts. On the empirical front, various studies have moved to inform the design of transfers and cash transfer programs in terms of anticipation to help economic agents to achieve their intertemporal plans. For Ghana, Buehren et al. (2018) find that salary delays increase overdraft behavior among rural workers. In Malawi, Goldberg (2017) tested whether recipients of unanticipated windfalls alter their consumption or timing of spending to evade re-distributive pressure; finding that those who were exposed to greater social pressure by receiving a prize in public spent incomes faster than those who received the prize in secret. In fact, in such contexts, Boltz et al. (2019) find that consumption is generally affected by sharing norms. Both Goldberg (2017) and Boltz et al. (2019) document existence of significant heterogeneity in the impacts, with a higher reaction observed among the poor and women. Using an artefactual field experiment in Malawi to test the impact of defaulting savings (in cash or direct deposit into a pre-established account at a local bank) and delaying payments (by days) of a cash windfall, Brune et al. (2017) find evidence that savings defaults improve net deposits into bank accounts, but find little evidence that payment delays affect household expenditure. Even so, using the same context and data, among other datasets, Thakral and Tô (2022) observe that receiving a delayed windfall payment significantly improves household savings. Beyond such notable contributions, whether or

[3]Steinert et al. (2018) provides a review of such challenges as has been found in the literature.

not the impacts of payment delays might vary in the presence of subsistence constraints remains an unanswered question.

Motivated by Brune et al. (2017) who use payment delays to test the presence of time inconsistency, and Thakral and Tô (2022) who investigate how anticipation time for a transfer impacts household spending decisions, the contribution of this paper is mainly two-fold: first, I propose a theoretical modification of the behavioral life-cycle model to take into account subsistence constraints in order to better explain the observed behavioral anomalies. Second, I empirically test the existence of heterogeneity in the impact of payment delays on cash transfers in a developing country context. To the best of my knowledge, this paper is the first to test the role of such heterogeneity in impact of payment delays on household welfare.

For the empirical analysis, I use existing data from a windfall income experiment implemented by Brune et al. (2017) among 474 households in Malawi, cross-randomizing a savings default treatment into whether the unearned and unanticipated payments are made immediately, with one day delay, or with eight days delay. I replicate the empirical analyses by Brune et al. (2017) and Thakral and Tô (2022) with modifications to focus on the role of the eight-days delayed payments.

After presenting a modified theoretical mental accounting model to incorporate the role of subsistence constraints, I find evidence of heterogeneity in terms of wealth especially for the 8-days delay treatment. Particularly, although I find that delaying income payments by eight days improves total savings and in-kind savings by about $175 and $153 respectively, I find that the delay is more effective for wealthier households than for poorer households. In spite of finding that wealthier households tend to have more education, I find that the observed heterogeneity is not explained by education. In fact, the results hold across households with different characteristics, ruling out the possibility that heterogeneity is due to intra-household dynamics. These results demonstrate the role of subsistence constraints in the impact of payment delays.

This study adds to the theoretical literature on household saving and consumption decisions, particularly that in line with the mental accounting temptation hierarchy[4], proposing that intricacies in the nature and state of economic agents be considered in policy making. Particularly, I propose that in adopting waiting times of transfers to improve their effectiveness, there should be discrimination based on prospective beneficiaries' wealth profiles. Empirically, the paper relates to the few studies that examine payment delays as one component in the design of cash transfer programs (see Brune et al. (2017) and Thakral and Tô (2022)). I achieve these objectives while making use of already existing field experimental data in a developing country context.

Having introduced the study in Section 1, the rest of this paper is organized as follows.

[4]In their behavioral life-cycle model, Shefrin and Thaler (1988) incorporate the mental accounting model.

Section 2 presents the modified theory of mental accounting based on the life-cycle model, as the first contribution of this paper. While Section 3 presents the intervention, data and study context; Section 4 presents the analytical framework. Section 5 presents the findings from the empirical analysis - which is the second contribution of the study - and Section 6 concludes the paper.

2 Modified Mental Accounting Model

I get inspiration from Thakral and Tô (2022) in their extension of the behavioral life-cycle model by Shefrin and Thaler (1988) and Thaler (1990) to fit a model that explains saving behavior by economic agents. Particularly, in explaining spending decisions out of windfalls, the model contends that there exist three mental accounts to which various income streams are cognitively classified, namely; current income, current assets, and future income. These forms of income are non-fungible and the mental accounts are said to have different marginal propensities to consume (MPCs), with future income having the lowest MPC - close to zero - and current income having the highest MPC - close to unity. As an example, while retirement savings and pensions have relatively low MPCs, other forms of wealth - such as earnings from a lottery or from a raise in one's salary - have much higher MPCs. Thakral and Tô (2022) echo the notion by Shefrin and Thaler (1988) that the magnitude and source of income has a significant bearing on spending decisions, such that "People tend to consume from income and leave perceived 'wealth' alone. The larger is a windfall, the more wealth-like it becomes" (p. 27 Thakral and Tô, 2022; Shefrin and Thaler, 1988, p. 635). The works argue that beyond the magnitude and income source, the MPC depends on the time dimension for anticipation of a windfall, with Shefrin and Thaler (1988) adopting a reduced form approach to model time dimension impacts on the MPC.

I adopt the depiction by Shefrin and Thaler (1988) that information about a windfall of magnitude m arrives at time $t = 0$, and the windfall is deposited to a separate intermediate or windfall account before a fraction μ is transferred into the current income or spending account, considering the level of m and time t. As such, Shefrin and Thaler (1988) propose the nonlinear functional form:

$$\mu(m, t) = \beta^m \alpha^t \tag{1}$$

From equation 1, Thakral and Tô (2022) do not restrict the values taken by parameters β and α, but argue that if β and α are between 0 and 1 then the economic agent treats smaller and more recent windfalls as more spendable. In the literature, the mental categorization of windfalls is found to be driven by disparate factors, including internal commitment (devices) (Bryan et al., 2010), goal-setting (Koch and Nafziger, 2016), planning (Kőszegi and Rabin, 2009), and self-control (Galperti, 2019; Duckworth et al., 2019).

At this point, I modify this model to introduce subsistence constraints in the form of wealth. To keep the model simple, I start by assuming that agents' income is spent into consumption and saving; and hence I denote the fraction that is saved by λ, such that $\lambda = 1 - \mu$. I recognize that any economic setup is made up of economic agents with distinct wealth classes, and therefore to ensure that the model is universally applicable in various states and conditions of wealth endowment, I distinguish between two types of economic agents, as follows:

1. Subsistence-unconstrained economic agents: These are agents whose wealth endowments are relatively high, beyond a wealth threshold – say $\tilde{W}$ – defined subjectively at the community level, and so are able to live beyond simply targeting subsistence ($W \geq \tilde{W}$).

2. Subsistence-constrained economic agents: These are agents with relatively lower wealth endowments with basic survival as a primary objective. The agents have wealth below the minimum subsistence threshold, $W < \tilde{W}$, and so subsistence constraints are binding. Typically, these households have decumulated wealth and I therefore argue that they work with less than the three mental accounts proposed by Thakral and Tô (2022) and Shefrin and Thaler (1988). In line with the poverty traps literature where saving and investment are impinged upon when economic agents are not "rich enough" (see Banerjee (2001) and Bryan et al. (2014)), I argue that at $W < \tilde{W}$ all available resources have to be directed towards current maintenance in the face of a threat of serious illness or death. Accordingly, any anticipated or unanticipated windfalls are "reasonably" channeled from the intermediate account to the current income account for current consumption.

Adjusting for the subsistence constraints, I modify the simple functional form by Thakral and Tô (2022) [which can compactly be expressed as $\lambda(m,t) = 1 - \mu(m,t) = 1 - \beta^m \alpha^t$] as follows:

$$\lambda(m,t,W) = 1 - \mu(m,t,W) = [1 - \beta^m \alpha^t] \cdot 1_{\tilde{W}}(W) \tag{2}$$

Where $1_{\tilde{W}} : W \to \mathbb{R}$ so that

$$1_{\tilde{W}}(W) = \begin{cases} 1 & \text{if } W \geq \tilde{W} \\ 0 & \text{if } W < \tilde{W} \end{cases} \tag{3}$$

From this model, the key implication is that windfall saving s out of windfall amount $m = \omega_\tau$ at any time τ can be disaggregated for the two wealth classes distinguished by the

threshold $\tilde{W}$, as follows:

1. Subsistence-unconstrained: $s_\tau = \lambda(m, t, W) \cdot \omega_\tau$ where $\hat{y}_{it} = y_{it} + \eta_{it}$ such that the process of saving is independently and identically distributed (i.i.d.)
2. Subsistence-constrained: $s_\tau = 0$

These predictions support the possibility of existence of a poverty trap as is postulated in the literature, given that economic agents with wealth endowments below the subsistence level $W < \tilde{W}$ are unable to save up for profitable investments, whereas their wealthy counterparts can save and invest.

3 Experimental Design and Data

I use existing data from a randomized control trial (RCT) implemented in Malawi by Brune et al. (2017) to encourage savings and understand how ownership of bank accounts affects consumption and saving[5]. The experiment was conducted through a local commercial bank, New Building Society (NBS), in one of the southern districts of Malawi - Mulanje - which is the core of Malawi's tea growing industry (see Figure 1 for a map of the study area). Targeted in the experiment were households in villages located within a radius of six kilometers from the bank's branch in Mulanje. In July, 2012, Brune et al. (2017) randomly selected 872 households for survey within the surrounding communities and made them account offers, consequently seeing 742 individuals opening bank accounts. From this group, a subset of 600 individuals was selected for the windfall cash experiment, 20 percent of which serve as the control group.

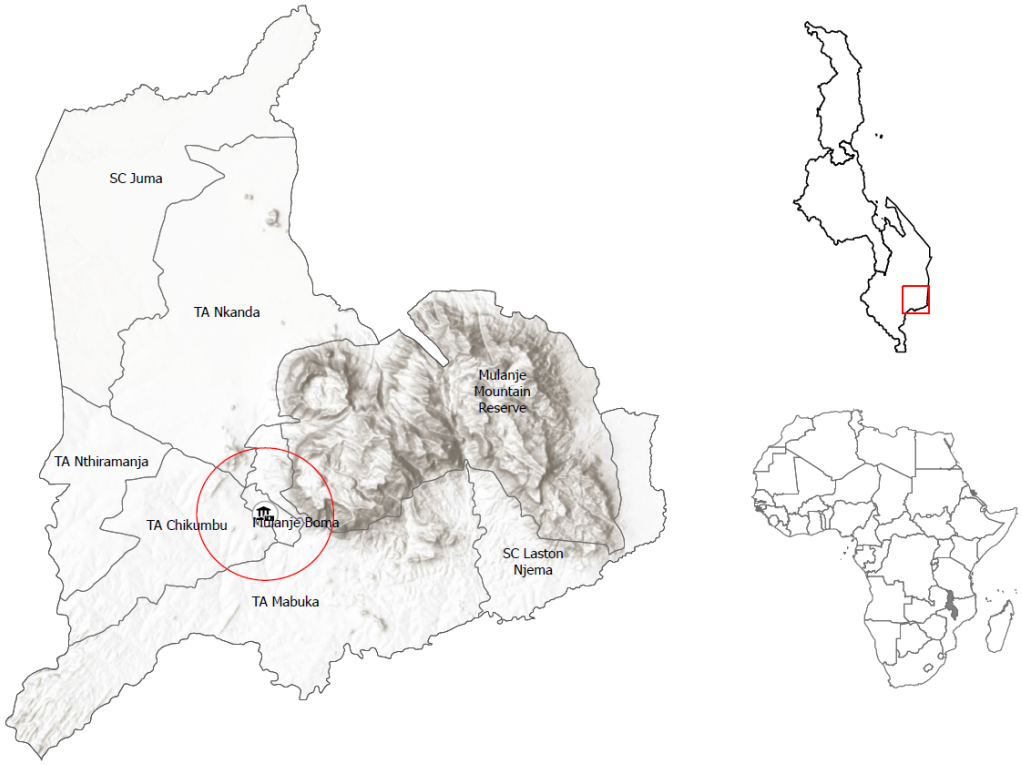
In terms of the interventions, the authors varied conditions for which 474 households received a one-time sixty dollar (MK 25,000) "large" windfall - either receiving it in cash or as a direct deposit into the formal savings account[6]. This savings default treatment was cross-randomized with timing of payment, to have households receiving the transfers either immediately, with a one-day delay or with an eight-day delay. A total of 156 households received their payments immediately (74 households in cash and 82 households through the bank); 158 households received their transfers with a one-day delay (79 households each for cash and direct deposits); and 160 households received the payments with an eight-day delay (81 households in cash and 79 households as a direct deposit). The transfers were designed for the end of the lean season (between March and April 2014). To reimburse the control group for their travel and time costs, as well as to encourage their participation in future surveys, a "small" immediate payment of about $2.38 (MK 1,000) was made.

[5]See Sections 2 and 3 in Brune et al. (2017) for more details about the experimental design and data. This existing data for Malawi was also used by Thakral and Tô (2022) in their multi-country study which also uses existing data sets from Kenya and the US.

[6]I use the 2014 nominal exchange rate at MK 420 per USD and the exchange rate at purchasing power parity (PPP) conversion factor MK 141.64 per $, as cited by Brune et al. (2017).

Within the treatment group, a total of three surveys were administered. The first was the initial household visit and baseline survey (at the same time for all individuals) at which an announcement of a possible money prize pending the individual visiting the bank in two days was made. Individuals were pre-allocated a morning or afternoon visit at the bank to separate those receiving a cash amount from those getting a direct deposit. The other two surveys (midline round 0 and midline round 1) were follow up surveys scheduled depending on the exact treatment group of the household. Particularly, for those who got immediate payments (at day 0) and for those who got the one-day delay, the first follow up survey was designed to track spending behavior a week after receipt of the transfer (at days 7 and 8 respectively), and the second follow up survey was timed for two weeks later (at days 14 and 15 respectively). For the eight-day delay treatment arm, the first follow up survey tracked spending behavior a week after learning of the upcoming transfer and a day before the transfer (at day 7) and the other follow up survey was conducted 7 days after the transfer (at day 15). The survey adopted the expenditure module from Malawi's Third Integrated Household Survey (IHS3).

Figure 1: Location of the Study Area in Malawi and Africa



4 Analysis

Following Brune et al. (2017) and Thakral and Tô (2022) who both use household survey data for Malawi, the main objective in the empirical section is to examine existence of heterogeneity in the impact of payment delay on savings. I modify Equation (3) from Brune et al. (2017) and Equation (6) from Thakral and Tô (2022) and focus only on the longer term 8-day delay - which predominantly explains increases in savings (see Thakral and Tô (2022)). I leave out the very short (1-day) delay from the analysis because it has an insignificant effect on all forms of savings - in-kind, financial and total - and the lack of precision presents difficulties in learning more about the relationship Thakral and Tô (2022). I therefore estimate the following model:

$$Y_i = \alpha + \beta Delay8_i + \gamma Wealth_i + \lambda(Delay8_i \times Wealth_i) + \delta Y_{i0} + \Gamma InterviewWeek_i + \Theta Village_v + \eta_i \quad (4)$$

where Y_i represents the outcomes of interest (total savings, in-kind savings and financial savings) for household i after two weeks from the midline round 0; $Delay8_i$ represents the eight-day delay - which was a treatment variable of interest in Thakral and Tô (2022); $Wealth_i$ represents the total household wealth measured by the principal component index based on 62 asset and seven livestock categories; Y_{i0} represents baseline levels of the outcomes of interest (measured at midline round 0); $Interviewweek_i$ captures week-of-first survey fixed effects; $Village_v$ captures village fixed effects; and η_i is an idiosyncratic disturbance. The main coefficient of interest is λ; significance of which implies that there is heterogeneity in the impact of the payment delay by wealth. In terms of the sign, a negative coefficient ($\lambda < 0$) means that there is heterogeneity in favor of poor households - such that the impact of the delay is more effective for the poorer households; whereas a positive coefficient ($\lambda > 0$) means the impact of the delay is more effective for wealthier households.

5 Results

In this section, I present results from the analysis; starting with summary statistics and key estimation results and then the robustness checks I conducted.

5.1 Summary Statistics

Both Brune et al. (2017) and Thakral and Tô (2022) report that randomization in the experiment produced balanced and comparable groups (presented in their Table 3 and Appendix Table 12 respectively, both of which I am able to replicate). That said, I begin by presenting brief summary statistics of the key variables used in the analysis, shown in Table 1. The statistics show that about 67% of the sampled 474 households received a delayed payment (33% with the one-day delay and 34% with the eight-day delay) and 23% of the respondents have hyperbolic preferences. Most of the respondents (95%) are in the bottom half of the computed principal component analysis (PCA) asset index range, indicating that many sampled households are predominantly relatively poor. In terms of education, most of the respondents (13.3%) reported level 6 as the highest level of attainment, with 74.7% not having gone beyond level 8. This is in line with figures by the National Statistical Office (NSO, 2012), which revealed that a high proportion of the population (74.2%) had not attained any qualification around the time Brune et al. (2017) conducted the survey in Malawi. (The smallest education qualification in Malawi is attained upon successful completion of level 8). On average, both in-kind savings and financial savings rose after the transfer experiment (from $PPP 102 (MK 14,436) to $PPP 159 (MK 22,460) and from $PPP 100 (MK 14,211) to $PPP 167 (MK 23,630), respectively), translating into an overall rise in total savings (from $PPP 206 (MK 29,128) to $PPP 335 (MK 47,413)).

5.2 Main Econometric Results

5.2.1 Heterogeneity in the Impact of the Eight-Day Delay

Equation 4 tests the existence of heterogeneity in the impact of the eight-day delay treatment on savings. Particularly, heterogeneity in terms of wealth is captured by coefficient λ. Table 2 confirms findings by Thakral and Tô (2022) that the eight-day delay treatment improved total savings - mainly driven by improvements in in-kind savings which include advance purchases of farm inputs, business inventory, and bags of maize. This demonstrates the prominence of in-kind savings over financial savings within the context. The results show that the eight-day delay is more effective in improving savings (both in-kind and total savings) for wealthier households than for poorer households; with wealth captured by the asset index - which is a principal component index based on 62 asset and seven livestock categories. This means that the mental accounting theory proposed by Shefrin and Thaler

Table 1: Summary Statistics

Variable	N	Mean	SD	Min	Max
1-Day Delay	474	0.33	0.47	0	1
8-Day Delay	474	0.34	0.47	0	1
Baseline					
Asset Index	474	-0.16	3.12	-3	15.32
Highest Education Level	474	5.94	3.88	0	14
Hyperbolic	474	0.23	0.42	0	1
Midline Round 0					
Total Savings	474	205.65	409.35	0	2,548.72
In-kind Savings	474	101.92	296.81	0	2,118.05
Financial Savings	474	100.33	196.11	0	1,292.01
Midline Round 1					
Total Savings	474	334.74	531.77	0	4,949.17
In-kind Savings	474	158.57	364.52	0	3,523.02
Financial Savings	474	166.83	239.87	0	1,772.10

Brune et al. (2017) define the asset index as a principal component index based on 62 asset and seven livestock categories; financial savings as the sum total of formal savings (mainly with a formal commercial bank) and informal savings (through community savings groups, rotating savings and credit associations (ROSCAs), friends, and at home etc); in-kind savings as the sum of advance purchases of farm inputs, business inventory and bags of maize. All monetary values are captured in $PPP, with the 2014 exchange rate: MK 420 per USD, or MK 141.64 per $PPP.

(1988) and Thakral and Tô (2022) works mainly in the absence of subsistence constraints. With subsistence constraints binding, economic agents are basically struggling to survive, and hence windfalls are mainly channeled to consumption. Heterogeneity in the impact of the delay on in-kind savings is illustrated graphically using Figure 2, whereas heterogeneity in impact on total savings is illustrated by Figure 3. Both figures show that the impact of the delay is higher on average for wealthier households than for poorer households.

In the literature, observation of heterogeneity in related impacts has been documented by a number of studies. First, Boltz et al. (2019) found that poorer women in urban Senegal are more responsive to a strategy to hide income than less poor women; as they commit less income to kinship tax when they can hide their resources so as to spend more on themselves and their households. Similarly, in Kenyan villages, Jakiela and Ozier (2015) uncovered heterogeneity in the importance of social pressure in interhousehold transfer relationships within kin networks in poor communities; as women whose investment returns were observable by the public were found to hide a portion of their income, compared to women whose investment outcomes were not made public. Dupas and Robinson (2013) also found differential impacts of access to a savings account between market women and bicycle taxi drivers, in favor of the women.

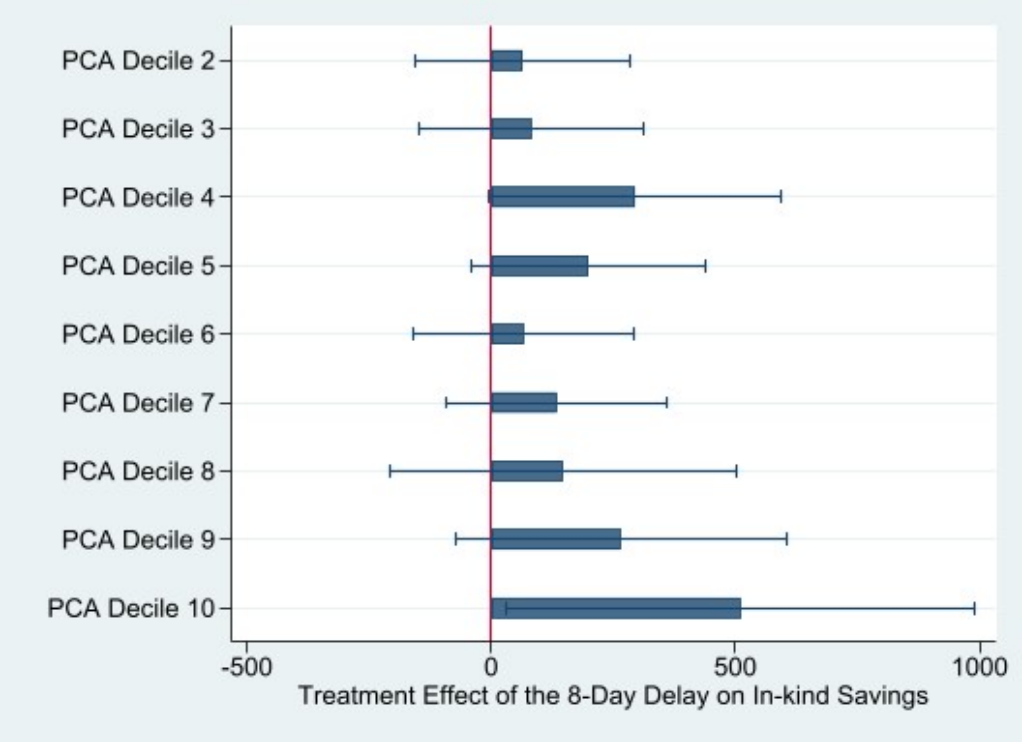
Table 2: Estimation Results for Heterogeneity in Impact of 8-Day Payment Delay

	Total Savings		In-kind Savings		Financial Savings	
	(1)	(2)	(3)	(4)	(5)	(6)
8-Day Delay	166.029***	175.486***	141.996***	153.288***	29.084	26.085
	(40.866)	(42.616)	(33.446)	(35.535)	(17.763)	(18.365)
Wealth	27.269**	15.978	21.552*	6.944	7.918	11.188
	(12.459)	(13.079)	(10.973)	(10.105)	(5.739)	(6.798)
Delay × Wealth		43.398*		53.507**		-13.613
		(26.188)		(25.475)		(9.869)
Total Sav. (Pre)	0.801***	0.792***				
	(0.144)	(0.138)				
In-kind Sav. (Pre)			0.609***	0.611***		
			(0.148)	(0.142)		
Financial Sav. (Pre)					0.739***	0.755***
					(0.138)	(0.135)
F	8.609	8.583	3.090	2.975	4.676	4.584
p	0.000	0.000	0.000	0.000	0.000	0.000
N	474	474	474	474	474	474

Robust standard errors in parentheses. Regressions include village and week-of-first-survey fixed effects. Wealth is defined by the Asset Index which is a principal component index based on 62 asset and seven livestock categories. Exchange rate: MK 420 per USD, or MK 141.64 per $PPP. "Pre" means the savings variable is as captured at baseline.

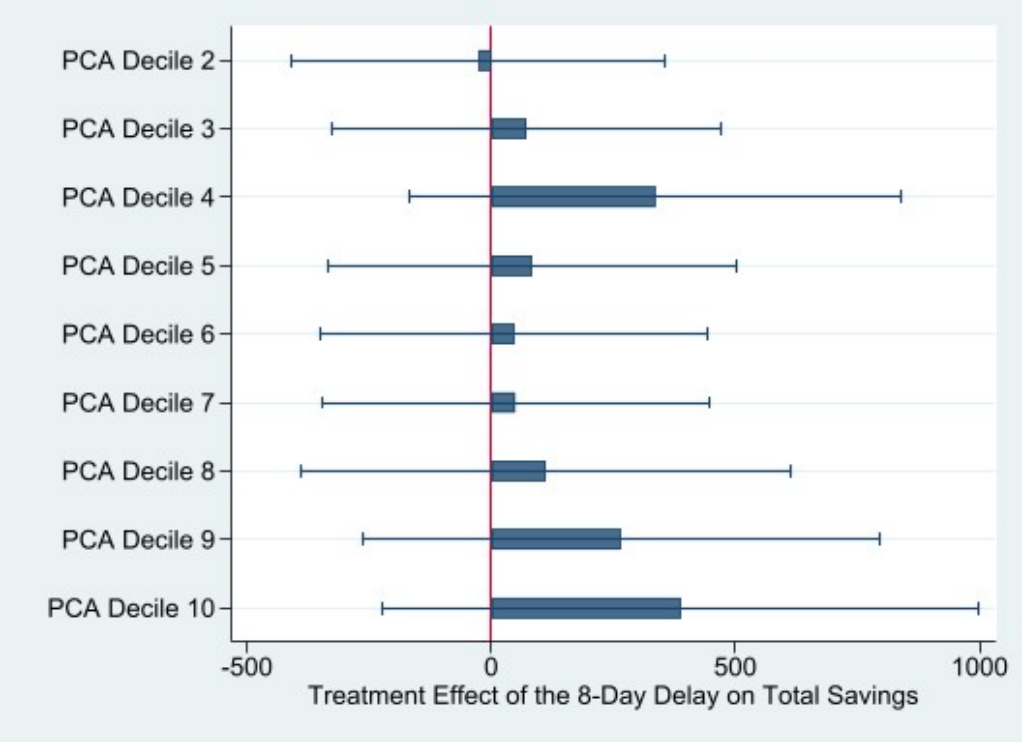
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 2: Treatment Effects of the 8-Day Delay on In-kind Savings - by Wealth



Bars and capped spikes correspond to the point estimates and 95% confidence intervals for the 8-Day Delay interacted with deciles of the asset index, respectively. The figure shows effects for 9 deciles, excluding the first decile as the reference category.

Figure 3: Treatment Effects of the 8-Day Delay on Total Savings - by Wealth



Bars and capped spikes correspond to the point estimates and 95% confidence intervals for the 8-Day Delay interacted with deciles of the asset index, respectively. The figure shows effects for 9 deciles, excluding the first decile as the reference category.

5.2.2 Alternative Explanations

One prominent observation within the study context is that redistributive (social) pressure affects timing as well as quantity of saving/consumption and investment, as was found by Goldberg (2017) in Malawi and Boltz et al. (2019) in Senegal, as transfer recipients strive to reduce obligatory transfers. However, this possible explanation of the impact of payment delays on consumption or savings - as was also previously found by Brune et al. (2017) and Thakral and Tô (2022) - is not responsible for differences in consumption/saving patterns among households in the sample, as depicted by Table 2, because households were in full control over their resources as the windfall payments were not made in "public settings" so as to expose recipients to social pressure which induces kinship taxation.

I also conducted analyses to check if the observed heterogeneity is driven by intra-household dynamics. First, I estimated the model for married household heads and for unmarried household heads, finding in Table 3 that results do hold across both types of households. Regression results in Table 4 show that the findings also hold for small house-

holds (those with less than 5 members) and large households (with at least 5 members) alike. This finding rules out the possibility that observed heterogeneity is driven by intra-household dynamics.

Table 3: Estimation Results for Heterogeneity in Impact of Payment Delays - by Marriage

	Total Savings		In-kind Savings		Financial Savings	
	(1)	(2)	(3)	(4)	(5)	(6)
8-Day Delay	260.621***	166.688***	256.412***	134.557***	-19.830	39.913
	(75.677)	(57.591)	(87.908)	(40.982)	(30.804)	(24.662)
Wealth	14.475	18.681	24.739*	3.264	3.109	14.834*
	(17.925)	(15.615)	(13.318)	(12.291)	(3.649)	(8.828)
Delay × Wealth	88.203**	22.054	113.867**	31.739*	-30.639**	-8.080
	(41.364)	(21.752)	(51.489)	(18.596)	(15.184)	(11.155)
Total Sav. (Pre)	1.045***	0.748***				
	(0.184)	(0.154)				
In-kind Sav. (Pre)			-0.087	0.634***		
			(0.166)	(0.151)		
Financial Sav. (Pre)					0.887***	0.729***
					(0.165)	(0.160)
F	.	6.412	.	2.977	.	4.060
p	.	0.000	.	0.000	.	0.000
N	177	297	177	297	177	297

Robust standard errors in parentheses. Regressions include village and week-of-first-survey fixed effects. Results in columns 1, 3 and 5 are for married households and those in columns 2, 4 and 6 are for unmarried households for the specific saving type indicated above it. Wealth is defined by the Asset Index which is a principal component index based on 62 asset and seven livestock categories. Exchange rate: MK 420 per USD, or MK 141.64 per $PPP. "Pre" means the savings variable is as captured at baseline.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Estimation Results for Heterogeneity in Impact of Payment Delays - by Household Size

	Total Savings		In-kind Savings		Financial Savings	
	(1)	(2)	(3)	(4)	(5)	(6)
8-Day Delay	158.820**	249.012***	105.936***	248.290***	48.941*	-8.109
	(65.252)	(83.560)	(39.394)	(83.063)	(26.662)	(28.454)
Wealth	19.420	5.516	11.725	-1.822	3.400	18.141
	(18.159)	(11.209)	(12.489)	(12.711)	(5.179)	(12.251)
Delay × Wealth	24.913	78.404	27.426	99.446*	-1.536	-31.201**
	(25.485)	(50.324)	(19.802)	(51.000)	(9.522)	(15.696)
Total Sav. (Pre)	0.742***	0.844***				
	(0.220)	(0.113)				
In-kind Sav. (Pre)			0.628***	0.586***		
			(0.190)	(0.209)		
Financial Sav. (Pre)					0.876***	0.667***
					(0.140)	(0.212)
F	4.423	10.303	3.362	1.454	6.819	3.150
p	0.000	0.000	0.000	0.103	0.000	0.000
N	231	243	231	243	231	243

Robust standard errors in parentheses. Regressions include village and week-of-first-survey fixed effects. Results in columns 1, 3 and 5 are for small households and those in columns 2, 4 and 6 are for large households for the specific saving type indicated above it. Wealth is defined by the Asset Index which is a principal component index based on 62 asset and seven livestock categories. Exchange rate: MK 420 per USD, or MK 141.64 per $PPP. "Pre" means the savings variable is as captured at baseline.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.3 Robustness Checks

I proceeded to conduct analyses in order to find other possible explanations for the existence of heterogeneity. Agreeably, respondents for whom subsistence constraints are binding may differ from respondents for whom subsistence constraints are not binding in many ways. In such a case, the estimated heterogeneity could be driven by variables that are correlated with the level of wealth. Of the variables that are theoretically expected to be related to wealth, I observe that wealthier households in the sample tend to be more educated, as shown by column 1 of Table 5. The implication of this observed relationship is that the observed heterogeneity in impact of payment delays could essentially be simply driven by education. I therefore conducted analyses to rule out this possibility, by estimating model specifications that control for the level of education. In terms of present bias, I do not find evidence of a significant relationship between wealth and the hyperbolic measure (see

column 2 of Table 5). Nonetheless, I still conducted analyses to rule out its effect.

Table 5: Effect of Education on Wealth and Present Bias

	Wealth (Asset Index)	Wealth (Asset Index)
	(1)	(2)
Education Level	0.336***	
	(0.034)	
Hyperbolic		0.137
		(0.339)
F	99.817	0.163
p	0.000	0.686
N	474	474

Robust standard errors in parentheses. Education is measured by the highest level completed. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

To rule out the effects of education and present bias, I then estimated Equation 4 having controlled for the two variables. Starting with education, no significant changes in the coefficients and standard errors for wealth and its interaction term with the delay treatment are observed in Table 6 (columns 1, 3 and 5). This shows that heterogeneity by wealth of the impact of payment delays is not explained by education. By the same logic, I conclude based on results in Table 7 that the observed heterogeneity is not explained by respondents' present-biasedness. In fact, these conclusions hold after controlling for these two variables in the models, as shown in Table 8.

Table 6: Estimation Results for the Impact of 8-Day Payment Delay Controlling for Education

	Total Savings		In-kind Savings		Financial Savings	
	(1)	(2)	(3)	(4)	(5)	(6)
8-Day Delay	175.603***	129.452	152.978***	154.736**	-8.403	-8.403
	(42.721)	(78.613)	(35.755)	(72.944)	(31.570)	(31.570)
Wealth	16.182	17.521	6.386	6.333	12.096*	12.096*
	(13.498)	(13.425)	(10.673)	(10.790)	(6.832)	(6.832)
Delay × Wealth	43.387*	39.404	53.513**	53.663*	-16.592*	-16.592*
	(26.178)	(28.818)	(25.530)	(28.233)	(9.754)	(9.754)
Education	-0.496	-3.344	1.235	1.343	-1.835	-1.835
	(4.853)	(4.982)	(3.667)	(3.307)	(2.518)	(2.518)
Delay × Education		7.561		-0.288	5.643	5.643
		(11.871)		(9.622)	(4.777)	(4.777)
Total Sav. (Pre)	0.793***	0.795***				
	(0.140)	(0.141)				
In-kind Sav. (Pre)			0.609***	0.609***		
			(0.142)	(0.143)		
Financial Sav. (Pre)					0.756***	0.756***
					(0.135)	(0.135)
F	8.994	9.164	3.457	3.500	4.436	4.436
p	0.000	0.000	0.000	0.000	0.000	0.000
N	474	474	474	474	474	474

Robust standard errors in parentheses. Regressions include village and week-of-first-survey fixed effects. Wealth is defined by the Asset Index which is a principal component index based on 62 asset and seven livestock categories. Exchange rate: MK 420 per USD, or MK 141.64 per $PPP. "Pre" means the savings variable is as captured at baseline.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Estimation Results for the Impact of 8-Day Payment Delay Controlling for Present Bias

	Total Savings		In-kind Savings		Financial Savings	
	(1)	(2)	(3)	(4)	(5)	(6)
8-Day Delay	171.861***	213.152***	150.863***	184.265***	25.452	29.905
	(42.164)	(49.062)	(35.225)	(41.246)	(18.377)	(22.637)
Wealth	16.099	16.106	6.993	7.082	11.241*	11.236
	(13.025)	(12.979)	(10.113)	(10.088)	(6.805)	(6.822)
Delay × Wealth	43.787*	44.690*	53.759**	54.518**	-13.516	-13.430
	(26.083)	(26.043)	(25.414)	(25.390)	(9.862)	(9.918)
Hyperbolic	-68.458*	-11.405	-45.398	0.682	-12.230	-6.059
	(36.042)	(32.534)	(27.650)	(25.161)	(14.572)	(18.069)
Delay × Hyperbolic		-187.722**		-151.673**		-20.244
		(90.457)		(71.886)		(30.152)
Total Sav. (Pre)	0.791***	0.794***				
	(0.137)	(0.135)				
In-kind Sav. (Pre)			0.611***	0.612***		
			(0.141)	(0.138)		
Financial Sav. (Pre)					0.753***	0.754***
					(0.136)	(0.136)
F	8.041	7.913	2.835	2.941	4.398	4.331
p	0.000	0.000	0.000	0.000	0.000	0.000
N	474	474	474	474	474	474

Robust standard errors in parentheses. Regressions include village and week-of-first-survey fixed effects. Wealth is defined by the Asset Index which is a principal component index based on 62 asset and seven livestock categories. Exchange rate: MK 420 per USD, or MK 141.64 per $PPP. "Pre" means the savings variable is as captured at baseline.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Estimation Results for Heterogeneity in Impact of Payment Delay - Controlling for Education and Hyperbolic

	Total Savings		In-kind Savings		Financial Savings	
	(1)	(2)	(3)	(4)	(5)	(6)
8-Day Delay	171.902***	176.779**	150.476***	192.457**	25.357	-3.322
	(42.280)	(85.365)	(35.461)	(79.366)	(18.398)	(33.561)
Wealth	16.165	17.505	6.339	6.391	11.094	12.098*
	(13.443)	(13.359)	(10.666)	(10.762)	(6.844)	(6.828)
Delay × Wealth	43.783*	41.494	53.768**	55.261*	-13.494	-16.303*
	(26.083)	(28.771)	(25.470)	(28.242)	(9.859)	(9.766)
Education	-0.163	-3.089	1.448	1.482	0.360	-1.754
	(4.874)	(4.954)	(3.666)	(3.286)	(2.188)	(2.544)
Delay × Education		6.010		-1.416		5.409
		(11.874)		(9.706)		(4.764)
Hyperbolic	-68.405*	-9.371	-45.848*	-0.262	-12.367	-4.872
	(36.173)	(32.728)	(27.614)	(25.117)	(14.617)	(18.307)
Delay × Hyperbolic		-187.754**		-150.887**		-19.138
		(91.209)		(72.425)		(30.380)
Total Sav. (Pre)	0.791***	0.797***				
	(0.139)	(0.137)				
In-kind Sav. (Pre)			0.609***	0.610***		
			(0.141)	(0.139)		
Financial Sav. (Pre)					0.752***	0.756***
					(0.136)	(0.136)
F	8.416	8.555	3.304	3.466	4.437	4.221
p	0.000	0.000	0.000	0.000	0.000	0.000
N	474	474	474	474	474	474

Robust standard errors in parentheses. Regressions include village and week-of-first-survey fixed effects. Wealth is defined by the Asset Index which is a principal component index based on 62 asset and seven livestock categories. Exchange rate: MK 420 per USD, or MK 141.64 per $PPP. "Pre" means the savings variable is as captured at baseline.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6 Conclusion

The role of cash transfer programs in improving economic, educational, health and social outcomes, among others, cannot be overemphasized especially for less developed countries. Even so, success of cash transfer programs heavily depends on their design, among other things. Issues of the design of cash transfer programs range from whether transfers are

conditional or not, to whether they are received only by the household head or by any random household member. As a design feature, timing of transfers is one important consideration as anticipation time may permit households to carefully plan and re-plan their saving and consumption decisions, as postulated by the mental accounting model, first presented by Shefrin and Thaler (1988) and Thaler (1990). However, intricacies involved in decision-making may vary between households of diverse characteristics and hence the impact of payment delays could differ. This paper investigates such heterogeneity to fill the research gap.

In this study, I suggest a theoretical modification to the mental accounting model to introduce the role of subsistence constraints in the impact of payment delays for cash transfers. Particularly, I argue that the poor do not work with all the three mental accounts proposed in the theory. I then use already existing data collected from a field experiment implemented in Malawi by Brune et al. (2017) to empirically examine existence of such heterogeneity. The experiment cross-randomized a savings default treatment into various payment delay periods for an unearned windfall, as follows: 0 days (immediate), 1 day and 8 days. The key finding from this study is the confirmation of existence of heterogeneity in the impact of payment delays (especially for the eight-day delay) in terms of wealth. This suggests that cash transfer programs need to carter for the disparate characteristics among beneficiaries. The finding of heterogeneity in wealth is not surprising in light of evidence by Banerjee and Duflo (2007) who find that the poor have unique living arrangements that are different from those of the rich; including not having enough to eat, having a high level of morbidity and having bigger families.

7 Appendix

Brune et al. (2017) have made available supplementary data associated with this article in their online version at http://dx.doi.org/10.1016/j.jdeveco.2017.06.001.

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