The design of public works and the competing goals of investment and food security

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Public works programs, sometimes referred to as workfare programs, are an important social protection tool in low-income settings (Grosh et al., 2008). By requiring participants to work in order to receive a benefit (be it cash or an in-kind transfer), they hold appeal for different reasons. Unlike unconditional cash, participants contribute for the payment, often building or repairing community infrastructure. In theory, participants self-select, removing the necessity of implementing complicated targeting schemes on the ground. Rising commodity and fuel prices and the recent global financial crisis have stimulated interest in the usage and effectiveness of public works in the developed world and in low-income countries. In sub-Saharan Africa, public works range widely in objective, structure, and size. Although data on the scale of public works in sub-Saharan Africa is scarce, particularly for projects designed to address systemic poverty or the recent financial crisis, McCord and Slater (2009) identified 167 programs across 29 different countries in the region. Despite the pervasiveness of public works in low-income countries and the extensive descriptive and theoretical literature on them, comparatively little research attention has been paid to the key design features of project timing and payment distribution, both of which may significantly alter program impacts.

Malawi is now in the third phase of its large-scale public works program under the Malawi Social Action Fund. Both in this third phase and moving into the fourth phase, the government is expanding the program, both in terms of number of participants and in the days worked and size of payments. The program has been operational since the mid-1990s and aims to provide short-term labor-intensive

activities to poor, able-bodied households for the purpose of enhancing their food security, mainly through increased access to farm inputs at the time of the planting period. The program is designed to be interlinked with Malawi's large-scale fertilizer input subsidy program through the implementation of the public works scheme in the planting months of the main agricultural season when the fertilizer subsidy distribution also occurs. As such, this productivity objective shifted Malawi's program away from more traditional public works design that entail program implementation during the "lean" season, timing motivated by short-run food security goals. Such traditional public works aim to provide income at times of the year when consumption may be the lowest and when other forms of income generation are not as easily available. The productive link generally accrues as an indirect benefit, through the value of assets created or maintained.

How public works might impact households depends not only on the timing of the program but also on the payment structure, conditional on payment level. Because financial intermediation is relatively inaccessible for many poor residents of low-income countries, the savings and investment decisions of these poor households may be quite different than that exhibited by households in countries with more developed financial markets. Researchers have approached savings and investment by poor households from various perspectives. Goldstein and Udry (2008) establish a link between political power and the propensity to invest among rural farmers in Ghana. Others document that the poor may forgo small, profitable investments in agriculture (Duflo, Kremer, and Robinson 2008) when they procrastinate in making these investments, or in small enterprise (de Mel, McKenzie, and Woodruff 2008), because they may face high costs of saving money to purchase inputs. Duflo, Kremer, and Robinson (2008) also show that the timing of investment availability affects investment decisions. Timing of investment decisions may be particularly important for rural farmers, whose cash income, and therefore savings in-flows, fluctuate throughout the year. Other studies corroborate this sensitivity to timing by documenting the high interest rates that the poor may be willing to pay for short-term financial capital (Aleem, 1990, and Karlan

and Zinman, 2010). Another obstacle to accumulating lump sums of money from smaller payouts may be the demands from others in the social network. In Malawi, Brune et al. (2011) find increased use of agricultural inputs and increased household consumption for tobacco farmers who were offered "commitment" savings accounts that restrict access to cash and may provide a credible excuse for refusing requests for money from others in the social network.

Traditional economic theory explains low savings and high borrowing among the rural poor in terms of minimum subsistence constraints (the desire not to starve overwhelms concerns about capital costs), or in terms of strong preferences for present consumption over future consumption. However, empirical evidence does not fully support these explanations. The explanatory power of minimum subsistence constraints is undermined by evidence that the poor spend a significant portion of their income on non-necessities (Banerjee and Duflo, 2007). With respect to high discount behavior, such behavior coexists with a strong desire for commitments, as evidenced by participation in ROSCAs and demand for restricted savings accounts (Ashraf, Karlan, Yin, 2006).

Addressing these inconsistencies, a growing literature in behavioral economics has challenged the assumptions of the standard model and has turned to models that assume present-biased time preferences, or hyperbolic time discount functions. Under such assumptions, low savings are explained by issues of self-control; that is, competing preferences dictate different actions at different times (Ainslie, 1992, Laibson, 1996, Frederick, Loewenstein, and O'Donoghue, 2001, Ashraf, Karlan, and Yin, 2006). Typically, these hyperbolic discount rates operate over intervals of time measuring a month, a year, or longer. Our own qualitative work in central Malawi confirms that rural households perceive serious obstacles to saving money. Many people opt to have wages withheld for a week or more from casual labor activities in the private market, because money received daily may otherwise be used on temptation goods despite the intention to save it for a larger purchase. Our work has also show that households state a

preference for in-kind transfers rather than cash because, as they describe it, they "have difficulty keeping the cash". The problems described relate to very short-term savings, but the desire for commitment matches the behavior predicted by models with hyperbolic preferences.

In the context of public works, the payment structure may have important implications for the way households prepare and are able to execute a desired plan of action with respect to consumption and investment decisions. Moreover, even seemingly minor adjustments in how payments are made might matter. And with the advent of electronic payments via mobile phones, the potential to pay in small intervals (or larger ones) is now present in program design. Yet, there is little evidence on the consequences of this feature.

This study was implemented with the Government of Malawi in the 2012-2013 season of the public works program to examine these two dimensions of public works in rural Malawi: the timing of the projects and the payment structure. This work was informed by a serious of qualitative studies in 2010-2012 and a pilot in the 2011/2012 agricultural season. 192 villages were randomly assigned to one of 5 groups (Figure 1). The first of these groups is a pure control group (Group 0) in which villages do not participate in the PWP program in the 2012-2013 Season. Groups 1 through 4 all participate in the PWP in the planting season (1st Cycle of the PWP). These 4 groups vary in terms of the timing of the 2nd Cycle of the program and the schedule of payments in both cycles.

The study will be undertaken using 5 rounds of household survey data collected from 16 households in every village which includes non-participating households in villages with public works. The first two rounds pre-date the public works program and capture pre-program characteristics of households. The 3rd to 5th survey rounds explore expenditure and investment behaviors close to the receipt of the public works

payment. The fifth round also captures harvest outcomes for the 2012/2013 agricultural season. The design of the study intends to capture two dimensions.

Table 1: The 5 study groups

No PWP	**Group 0**	
	2nd Cycle timing variation:	
	April-May 2013 (post-harvest)	Jan-Feb 2013 (pre-harvest, lean season)
Payment variation:		
Lump sum payment in 1st and 2nd Cycle	**Group 1**	**Group 3**
Split payment in 1st and 2nd Cycle	**Group 2**	**Group 4**

First, what is the instrumental value of public works programs and what is the value-added of public works and, specifically, public works in the lean-season PWP? Comparing the four treatment groups to control group measures the impact of the 1st cycle of the program (during the planting season) on consumption patterns and farming investments of households. Comparing Groups 1-2 to Groups 3-4 measures the consumption smoothing or buffer role of PWPs.

Our second research question speaks to the structure of payments. Are there very short-term liquidity constraints and, if so, what are the implications for consumption and investment behavior? Comparing (Groups 1 and 3) to (Groups 2 and 4) will allow us to test the role of very short-term liquidity constraints. Empirical evidence on discounting, impatience, or credit constraints in the 'very short term' among low-income populations is virtually non-existent. There is a small but growing literature that tries to

empirically estimate discount rates, although with high imprecision and wide confidence interval. The limited evidence for Africa points to very high discount rate that would be meaningful over even short periods of time. Self-control problems may be binding in the very short run for poor households. This was an issue that emerged from extensive focus group discussions that we conducted in 2010 and 2011. By examining the interaction effects between the timing of the program and the schedule of payments, the study explores the seasonal variation in the impact of savings constraints. For Groups 3 and 4, the project will explore whether the temptation to spend on luxury goods affect households' ability to smooth consumption during the lean season. The split payment schedule in the planting season (1^{st} cycle) may inhibit ability to accumulate money to purchase fertilizer in December, but enhance consumption smoothing and reduce spending on temptation goods in February.