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Savings By and For the Poor: A Research Review and Agenda

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This is a working paper and we invite comments. Please email aishwarya.ratan@yale.edu with any feedback.

Savings by and for the poor: A research review and agenda

Dean Karlan, Aishwarya Lakshmi Ratan, Jonathan Zinman

Abstract

The poor can and do save, but often use formal or informal instruments that have high risk, high cost, and sub-optimal design. This could lead to undersaving compared to a world without market or behavioral frictions. Undersaving has important welfare consequences: variable consumption, low resilience to shocks, and foregone profitable investments. We lay out five sets of constraints that may hinder the adoption and effective usage of savings products and services by the poor: transaction costs, lack of trust and regulatory barriers, information and knowledge gaps, social constraints and behavioral biases. We discuss each in theory, and then summarize related empirical evidence, with a focus on recent field experiments. We then put forward key open areas for research and practice.

Keywords: Savings, Randomized Evaluation, Poverty

JEL codes: D12, D91, G21, O16

Contents

1. Introduction

Savings mobilization is critical for individual and societal welfare. At the individual level, savings help households smooth consumption, weather shocks, and finance productive investments in human and business capital. At the macroeconomic level, savings rates are strongly predictive of future economic growth.

Yet barriers to saving exist for many, particularly the world's poor. Market frictions, including transaction costs, lack of trust, and regulatory barriers, hinder the supply of savings products. 59% of the population in low and middle income economies lack access to a formal savings account (CGAP 2010b). Mounting evidence also suggests that various demand-side constraints depress saving even among those with access. Social claimants, lack of knowledge, and behavioral biases can all lead to sub-optimal saving.

Despite these barriers, evidence suggests that the poor have substantial (latent) demand for savings. Household surveys indicate that the poor do have some surplus that they use for non-essential expenditures (Banerjee and Duflo 2007). Similarly, detailed "diary" studies document complexity in poor households' financial portfolios and highlight the demand for small irregular flows that can be aggregated into lump sums for household or business investment (Rutherford 2000; Collins et al. 2009). Even when formal savings products are unavailable or unaffordable, the poor often save under mattresses, in informal groups, and/or in livestock.

Does removing barriers to saving produce tangible benefits? Microfinance institutions (MFIs) and many donors and policymakers are betting that the answer is yes, in a (double-) bottom-line sense. Microfinance institutions are often broadening their initial focus on microcredit to include now the provision of savings products.[2] MFIs now have 72 million microsavings clients, compared to 94 million microcredit clients (MIX 2012). The recent literature measuring the impacts of savings access starts with Burgess and Pande (2005), which uses a natural experiment on bank expansion (i.e., both credit and savings) in India from 1977 to 1990 to identify a 2.22 percentage point reduction in rural poverty per one percentage point increase in the share of savings held by rural banks. More recently, field experiments are producing a growing body of evidence on impacts (Ashraf, Karlan, and Yin 2006a; Ashraf, Karlan, and Yin 2010; Dupas and Robinson 2012a; Brune et al. 2013; Prina 2013). These studies show large positive impacts on welfare from improvements in access to and usage of formal savings, and hint at more transformative impacts than found thus far in similar evaluations of microcredit (see Angelucci, Karlan, and Zinman 2013 and Banerjee et al. 2009 for recent reviews).

Although savings is becoming a priority in the development agenda, it is not clear a priori that under-saving is a widespread problem and that everyone should save more, at least in the form of additional financial assets or investment. Policymakers and practitioners often overlook the possibility that the best route to saving more is to pay down existing debt. In other cases the utility benefits of current consumption are high. On balance, several studies in industrialized countries have found that people get their savings and consumption decisions about right over the life-cycle (Scholz, Seshadri, and Khitatrakun 2006), although debate continues to rage on this question (Poterba, Venti, and Wise 2013). Despite widespread interest in, e.g., "nudging" people to save more, it is not clear whether, where, to what extent, and for whom such nudges would be desirable.

We group potential explanations for "undersaving" into five categories: transaction costs, lack of trust and regulatory barriers, information and knowledge gaps, social constraints and behavioral biases, and review

[2] [also insurance and payments, see e.g., (Radcliffe and Voorhies 2012) for an overview of new payment channels for the poor; and "pro-savings" financial education and literacy training, see e.g. (Xu and Zia 2012) for a review.]

theory and evidence on each in Section 2. We restrict the review in this paper to the literature from studies in developing country sites, with footnotes pointing readers to relevant related work from the US or other industrialized countries.

Section 3 discusses measurement and methodological issues involved in accurately estimating impacts of expanded access to or usage of savings products.

Section 4 outlines a way forward, compiling a set of open questions from our detailed reviews in the previous sections. We focus on identifying needs and opportunities to improve products offered by the supply side and choices by the demand side, in order to improve long-term welfare.

More broadly, if we cannot attribute the intervention in savings to any of the constraints discussed in this paper, then it is likely that we must resort to paternalism to justify our intervention, and to act purely out of paternalism is a debatable position. Attaining sufficient nuance in determining when and how to intervene is critical to have any paternalistic input not be "opposed to individual responsibility" but actually "form a basis on which we might have freedom over what really matters in life" (Duflo 2012). When thinking about policy, therefore, one should think beyond "will this lead people to save more" but rather "will this relax a particular constraint, or lower a particular cost", and with that focus we now dive into these five sets of constraints in more detail.

2. Constraints to Saving

2.1 Transaction Costs

Zero transaction costs is a critical assumption for generating perfect markets, markets that maximize social welfare. Accessing and using formal savings products involves monetary costs such as account opening fees, minimum balance requirements, withdrawal fees, and transportation costs (time and money) to make transactions. Many policies also use price as a lever to encourage more savings. This may solve a problem, but indirectly (which one can reasonably argue is irrelevant, for policy, as long as there are no unintended consequences and it is cost effective). For example, we will later discuss time inconsistency as potentially an underlying mechanism behind undersaving. If a policymaker or donor wishes to match savings, thus providing above-market returns to the saver, they may increase savings to what would be considered optimal, but not by directly addressing the time inconsistency problem of the saver. We will discuss the evidence on subsidized programs as evidence on the transaction cost constraint, but note that in these cases they are if anything creating a market distortion with respect to pricing, in order to solve a separate problem.

2.1.1 Pecuniary costs

Monetary costs can be a major barrier for accessing and using formal financial services, especially since the fees are often a large proportion of poor people's savings. These can be fixed costs like account opening fees and minimum balance requirements, or marginal costs such as transaction fees and yields.

Subsidizing the account opening costs of bank accounts and of maintaining minimum balances has been shown to increase the take up of formal savings accounts and, in some cases, savings balances. A key early study exploring this in rural Kenya finds that eliminating opening costs has a significant positive impact on the take-up of bank savings accounts and on investment levels among micro-entrepreneurs (Dupas and Robinson 2012a). In this study of 392 self-employed individuals in a market area in western Kenya, 156 were randomly selected for the offer of a bank account with the opening fees of 450 Ksh (US $6.40) waived and the minimum balance of 100 Ksh (US $1.43) covered. The account had an effectively

negative interest rate (due to fees charged on withdrawals), which made it more akin to a commitment savings account than a fully liquid checking or savings account.

Despite the transaction fees, 87% of the treatment sample decided to take up the savings account and 54% of those who took up the account used it. They find a significant effect on business investment equivalent to a 38% to 56% increase in average daily investment among the treatment group, and increased daily expenditures by 37% four to six months after the accounts were offered. In response to the promising results from this study, replications are currently underway in Chile, Malawi and Uganda to examine whether relaxing the opening fee constraint has a similarly significant positive impact on formal savings account take-up, usage, and welfare in other contexts.

A recent field experiment in semi-urban Nepal finds similarly strong results from eliminating the costs of opening formal savings accounts among poor households (Prina 2013). From a sample of 1,118 households in 19 slum settlements, 567 female household heads were randomly chosen to receive the option of opening basic savings accounts on which they could transact in the slum (twice a week for 3 hours each day) that did not have any opening, maintenance or withdrawal fees (for a sense of the magnitude of these costs, the most common minimum balance requirement across the ten banks with most branches in Nepal at the time of the study was Rs. 500 (US$7)). The account offered a nominal interest rate of 6% on balances, which was lower than the Nepalese inflation rate of over 10%. The offer of the bank accounts was made through a public lottery in the 19 communities, and the remaining 551 women in the sample were not offered the free bank account and formed the comparison group.

84% of the households offered an account opened one, and 80% of those that opened an account used it frequently (making deposits of 8% of their weekly income 0.8 times a week on average). Access to these free savings accounts allowed participant households to accumulate significantly more wealth, increasing monetary assets by over 50% and total assets by 16% for households in the treatment group over the course of a year, without crowding out non-monetary assets such as livestock and consumer durables. Households that were offered the bank savings account were 45% more likely to buy medicines or traditional remedies than comparison households and made a 50% higher investment in school uniforms and textbooks than comparison households. The author also finds that those in treatment households did not suffer large decreases in income following health shocks.

Another recent field experiment with 564 unbanked households (both urban and rural) in Indonesia (Cole, Sampson, and Zia 2011) finds that an increase in the subsidy offered to open a bank savings account from $3 to $14 significantly increases the share of unbanked households that open the account nearly three-fold, from 3.5% to 12.7%. Offering a two-hour financial literacy training, on the other hand, has a very modest effect, and is less than half as cost-effective as the higher subsidies.

Despite this promising evidence, post-account-opening dormancy has been found to be an issue, which may be the result of other constraints. Dupas et al. (2012) provides vouchers for “free” savings accounts through random assignment to 55% of a sample of 1565 unbanked individuals in rural Kenya. While take-up among the treatment group was an encouraging 62%, only 28% of the group that opened an account made 2 or more deposits within a year of opening the account. In a follow-up qualitative survey, they find that a significant proportion of participants list risk of embezzlement, unreliable services, and high ongoing transaction fees as concerns with formal banking.

Schaner (2011) evaluates the impact of altering both fixed and marginal costs associated with transacting on a formal savings account through a field experiment in Kenya. 748 married couples were offered the option to open up to three accounts with the Family Bank of Kenya - a joint account, an individual account for the wife and an individual account for the husband - with a randomly assigned interest rate ranging between 0% and 10%. The bank had introduced ATM cards, which reduced transaction costs for withdrawals by over 50% (from $0.78 to $0.38) compared to over-the-counter transactions, but charged

$3.75 for customers to receive the card. The charge of receiving an ATM card was waived for a randomly selected subset of the 1,113 new accounts opened by the 748 couples in the sample, which increased the take up of the cards from 7% in the comparison group to 96% in the group that received the ATM card for free. Savings rates in the treatment group increased by 40% relative to the comparison group and saving balances increased by 16% when the ATM card intervention was targeted at joint accounts or accounts owned by men. However, the same intervention had an insignificant (but negative-signed) effect on account use and savings levels when targeted at individual accounts owned by women. This seems to be due to intra-household bargaining constraints, which we discuss further in section 2.4.1.

Varying the marginal yields on formal saving has found a range of impacts, based on the size of the incentive or subsidy offered. Large subsidies, for long-term savings or savings targeted at marginalized populations, have unsurprisingly shown large impacts in the US[3]. Schaner (2012) compares a market rate, 0%, to 4%, 12%, and 20% rates of return on savings in a field experiment in Kenya, and correspondingly finds high impact for large incentives. The highest rate offered resulted in a 20.9% higher take-up rate and an 8.5% higher usage rate compared to the comparison group that got no interest on saving (corresponding figures for the 4% interest group were 6.3% and 0.6%). The group offered the 20% interest rate had significantly higher transactions and average balances maintained in the savings account compared to the comparison group (0.42 more transactions and 119KSh higher balance), with the corresponding increase for the 4% interest group being 0.085 more transactions and 9.14KSh higher balance (not significantly different from zero).

In contrast, in a recent experiment in the Philippines, we study the demand for a commitment savings product featuring a spread of interest rates that were within range of being provided by the market without large subsidies (1.5%, 3%, and 3% conditional on reaching a self-set goal), while also varying account ownership arrangements (individual, joint, or choice of either) (Karlan and Zinman 2012). The study offered the accounts to a sample of 10,000 individuals with regular income streams but without an account in the bank, of which 23% opened the account. However, the results indicate that there was no significant effect of any of the treatments on take-up or savings balances implying price elasticity not significantly different from zero for the range of interest rates on offer.

2.1.2 Non-pecuniary costs

The non-monetary costs associated with formal banking can be large enough to discourage poor households from using formal savings services. These costs are typically very difficult to quantify. Researchers have studied how these costs are reduced using quasi-experimental variation in the presence of banks (thus reducing the travel and opportunity costs in terms of time and foregone wages), facilitating the administrative process of opening an account, and introducing new products and technologies that change the way people access and interact with banks.

Burgess and Pande (2005) studies an exogenous expansion of bank branches in India between 1977 and 1990, from a change in regulation that led to an increase in both credit and savings delivery to underserved areas, and clearly identifies measurable macroeconomic impacts on poverty reduction from the expansion of financial services. Similarly, in Mexico, Bruhn and Love (2009) examines the impact of

[3] In the US, Duflo et al. (2006) compares a market rate of return with 20% and 50% matches in evaluating take-up and savings levels for Individual Retirement Arrangement accounts; Mills et al. (2008) and Grinstein-Weiss et al. (2011) compare a market rate to 100% - 200% (1:1 or 2:1 matches) in Individual Development Accounts; Beshears et al. (2010) looks at the effect of removing employee contribution matching and instead introduce a fixed employer contribution level for automatic enrolment savings plans.

the simultaneous opening of 815 new branches of the newly formed Banco Azteca in 2002, and finds positive impacts on business, employment, and income in previously underserved areas[4].

Randomizing bank branch expansion to estimate impact on savings take-up and welfare impact can be difficult or unfeasible in many areas. As an alternative, some evaluations have estimated the impact of making some features of banks more easily available. Flory (2011) takes advantage of a natural field experiment in Malawi to study the effect of bringing banks closer to geographically secluded populations, through the introduction of a fully-equipped "bank on wheels", which also included an information campaign randomized at the community level to increase formal savings. To measure the impact of the banking expansion and its interaction with local safety-nets, a two-year (2008 and 2010) panel dataset containing about 2000 households was collected in the pre-harvest season. The study found that non-savers at baseline were 3.1 percentage points more likely to have a formal savings account in treatment areas and the effect was larger (3.7 percentage points) as the distance from the 'bank-on-wheels' stop increased. However, the most vulnerable households in the sample did not increase their formal savings.

In the Philippines, Ashraf, Karlan, and Yin (2006b) studies the randomized offer of a deposit collection service to micro-savers of a rural bank in the Philippines. The product had a cost of 4 pesos per visit, which could be monthly or bi-weekly. The service had a take-up of 28% among those clients who were reached by the marketing team. Interestingly, while time-preferences could be one of the reasons that clients elected to pay for the service (hoping that it would act as a soft commitment device from the pressure of having the deposit collector come to get one's savings at one's doorstep), the data did not show time-inconsistent preferences as a determinant of take-up. Distance, however, was a very strong determinant: the probability of take-up was 6 percentage points higher for each additional 10 km between the client's home and a bank branch. For the entire sample, being on a "barangay" where the deposit collector service was offered implied an increase of up to 40% in the savings stock compared to clients in comparison clusters[5]. Schaner (2011)'s study in Kenya also indicates significant increases in savings transactions and balances from use of the ATM network for jointly-held accounts and accounts owned by men, compared to only using bank branches to transact, though in this case it is unclear whether pecuniary or non-pecuniary cost reductions are driving the result.

There is some evidence that non-pecuniary costs significantly affect the demand for other key services as well with clear benefits for the poor. A recent study in Morocco by Devoto et al. (2012) shows that poor households that receive assistance with the administrative procedures needed to apply for both credit and a water connection had considerably higher take-up rates, with spillovers measured among neighboring households through social diffusion.

2.2 Lack of Trust and Regulatory Barriers

Once a person decides whether and how much to save or invest, her next decision is around how and where she should save. There is a wide range of formal, semi-formal and informal instruments, with varying levels of risk, convenience, and bureaucratic cost available to the poor and they typically construct portfolios that mix savings instruments with different cost-risk trade-offs.

Trust can help explain some shortfalls in the relationship between savers and formal financial institutions. Savings decisions are affected by trust in two ways: trust affects the willingness of individuals to use a

[4] Also see Aportela (1999) on the impact of opening new branches of a government banking institution using post offices to reach unbanked areas in Mexico.

[5] Early results from an ongoing study by McConnell (2012) with 1831 market vendors in Ghana, comparing the relative importance of convenience and information in increasing the adoption of formal bank savings accounts, also indicate that individuals seem to be over ten times more likely to open an account when they can open the account directly at their place of business, highlighting the importance of convenience as a deciding factor in financial decisions.

particular financial institution based on their subjective assessment of its reliability; trust also underlies the prudential norms imposed on formal financial institutions as deposit-holding entities by regulators to verify the identity and eligibility of clients.

In any economic transaction, the lack of trust by one party in the other acts as an implicit cost due to moral hazard and its impact on either increasing monitoring and enforcement costs, or leading to unconsummated transactions. Trust, however, is a relative notion. It could be the case that people have low levels of trust in all the financial mechanisms available to them, as might be the case in a post-war environment for instance. They would then need to choose the best option from the existing alternatives on offer, even if their confidence in all of the tools is low.

Guiso, Sapienza, and Zingales (2004) measures how trust and the development of financial markets are related in Italy using a large panel survey, and find that low-social-capital provinces use fewer checks and hold more cash. Similarly, Coupe (2011) looks at representative survey data from the FINREP Ukraine survey, and reports that more than half of the sample save in cash at home, with those who self-report as having low trust in banks being 10 to 15 percentage points more likely to keep all their savings in cash.

There is a sizeable behavioral economics literature on varying trust experimentally in lab settings, and evaluating the interaction of trust with risk propensities for instance (see Karlan 2005; Schechter 2007). There are to our knowledge, however, no randomized field evaluations that directly tackle the issue of low trust in formal banking services as a barrier to saving. Dupas et al. (2012)'s study in western Kenya with a sample of 1565 individuals, finds reasonable take-up but low active usage (28%) of free savings accounts. As follow-up, through a qualitative survey of a subset of 661 participants in the study, they find that low trust in the bank is often cited as a key concern that deters people from using formal bank accounts. As many as 15-37% of those who did not open or use the free savings account with one of the two participating banks cited unreliability as a concern, and 7-24% mentioned risk of embezzlement by the given bank as a concern. These low trust levels in the banks seemed to originate in a broader banking crisis that hit Kenya in the 1980s and 90s, which continued to color customers' views on banking with these institutions.

As expected, trust as a barrier to saving varies in its centrality, based on local context and history. A non-experimental study in Mexico (Djankov et al. 2008) reports on a survey of 4,765 banked and unbanked households, of whom 2,182 households did not have a bank account. When asked about their reasons for not having a bank account, only 2% of the sample mentioned not having confidence in the institution as opposed to 90% who stated they did not have enough money and 6% who said that they did not want an account.

Governments play an important role in building trust in formal institutions or systems involving strangers who are not bound by pre-existing social ties and reciprocal norms. Through prudential regulation, governments assure investors that banks and other similarly regulated financial institutions will honor their deposits. Prudential regulation has two basic goals: to protect small depositors in particular from losing their savings and, to ensure trust in the financial system as a whole and preserve the stability of the economy (Conroy 2000).

The recent financial crisis in the US and Europe has brought prudential regulation back to the forefront of discussion (Borio 2009) due to its critical role in providing stability to the financial system and allowing the government to provide confidence to investors that their investments will be honored. In the context of developing countries, similar discussions have been held recently to understand how best to regulate microfinance institutions so that they do not in any way misplace the trust placed in them by their investors and clients, especially given allegations of overindebtedness among clients. While it is clear that MFIs that only provide credit as part of their portfolios need not be prudentially regulated since they do not hold their clients' savings as an outstanding liability, it is more difficult to set a rule on when an MFI

holding savings should be included as a regulated institution. Small institutions, often operating at low cost and in the semi-formal sector, pose a practical barrier to regulation since they are much harder to supervise on requirements like capital ratios, financial reports, etc. (Christen and Rosenberg 2000). In almost all countries, there are significant legal restrictions on savings mobilization by non-bank MFIs, but these laws are either ignored by central banks or implemented very sparingly (Conroy 2000).

If under-regulation is a problem, over-regulation serves as a key barrier to entry in formal finance. The lack of stringent regulation might help explain why the microfinance sector has been able to develop in some countries. Bangladesh, Bolivia, Peru and Nepal are all examples of how minimal regulation has allowed enough space for small institutions to attend to the needs of the unbanked population (Conroy 2000).

Regulation imposes transactions costs for banks and customers. A key barrier to the expansion of small-balance savings accounts is the due diligence requirements on these accounts. These requirements, also known as 'Know Your Customer' (KYC) rules, stipulate that regulated institutions ask for specific identification documents (including proof of name, date of birth, national identity number and residential address), collect pre-determined information about clients, and monitor account activities that dissuade small savers, particularly poor individuals with few formal documents, from getting an account (Jentzsch 2009). Identification requirements can be one of the greatest obstacles to financial inclusion in developing countries. UNICEF statistics indicate that "the ratio of children (below the age of five) who are not registered ranges from 10 percent of all births in Latin America to 59 percent in South Asia, and a stunning 66 percent in Sub-Saharan Africa" (Jentzsch 2009).

KYC requirements pose a particular challenge to branchless banking. Face-to-face interviews by bank officials with clients are by definition impossible when accounts are opened in non-branch locations, calling for new ways to screen clients to comply with regulation. Although this part of the process can be outsourced to the agents with a presence in each transaction location, banks would still be accountable for the new accounts created. This accountability has become all the more salient since restrictive Anti-Money Laundering (AML) norms have been put in place to detect movements of money that might be related to terrorist activities. Moreover, if branchless banking is successfully extended to the poorest individuals, the traditional requirements for identity and residence proof would need to be revised given their nonexistence in these communities (Ivatury and Mas 2008).

There has been some experimentation around changing identification requirements in banking that impose a lower burden of proof on low-income clients without formal documentation[6]. Innovations in simplifying the KYC requirements for opening basic 'no-frills' savings accounts have been attempted in South Africa, Brazil, and India among other countries (see Bankable Frontiers 2009; CGAP 2010a; Jentzsch 2009), but there have been few evaluations on the impact of these changes.

In one of the few field experiments in this area, Chin, Karkoviata, and Wilcox (2011) examines the impact of overcoming a regulatory barrier to saving among Mexican immigrants in the US. From a sample of 184 Mexican immigrants, 99 were randomly chosen to receive assistance and a fee waiver (of US$27) to obtain a formal identification card, which is useful in enabling undocumented immigrants to open a bank savings account. They find that those in the treatment group were 38 percentage points more likely to have increased their savings over the 5-month period following the intervention. They also find that those in the treatment group saved 9 percentage points more and decreased their remittances to Mexico as a share of income by 6 percentage points relative to those in the comparison group. The results

[6] KYC problems that apply to credit markets have a more direct benefit in reducing moral hazard – see Gine, Goldberg, and Yang (2011) for the impact of introducing fingerprint identification on loan repayments and defaults in Malawi.

were heterogeneous, varying based on the self-reported level of control the migrants claimed to have over the spending of their remittances in Mexico, which we discuss in section 2.4.1.

2.3 Information and Knowledge Gaps

There are costs to acquiring the information and knowledge required to compare alternatives and make an informed choice, and decisions and behaviors around savings are no different. A lack of knowledge is typically understood to manifest in mean-zero errors, i.e., people may err, but they get the decision right on average (wisdom of crowds). However, this does involve some individuals saving too little and others saving too much, both of which can be improved through deliberate interventions that improve knowledge and provide the information needed to make better choices at the individual-level. There are certain other errors in decision-making that are widespread and involve most individuals slanting their choices in a particular direction away from optimal average outcomes, for e.g., saving too little. In these cases, we are not looking at an information problem per se, but rather at systematic biases in behavior, which we address in section 2.5.

A lack of knowledge can involve any number of pieces of information that are costly to acquire. Knowledge about prices, for example, may not impose prohibitive costs if the market is sufficiently competitive. However, knowledge on concepts such as compounding might indeed be prohibitively costly to acquire for the poor, leading to sub-optimal decisions around saving. In the absence of such knowledge, social mimicry is often another way to transmit information at lower costs. Individuals might well seek to emulate observed behavior corresponding with social norms, rather than make an independent choice themselves, which could lead to herding behaviors around sub-optimal choices (Banerjee 1992). Intervening to provide new information can modify these perceptions, or even shift preferences and social norms over time. Specific financial education programs, and correspondingly their evaluations, seek to address and measure changes in information or knowledge acquisition and retention alone, or additionally measure resulting changes in perceptions, attitudes and norms, and behavior.

The literature on financial knowledge indicates that a significant share of the population in both developed and developing countries lacks financial knowledge and is unprepared to make even simple financial decisions[7]. In India for instance, financial literacy levels have been measured to be extremely low: 26% of respondents provided no correct answers to four questions on basic financial principles in a recent survey, and only 3% answered all four questions correctly (Cole, Sampson, and Zia 2011). Further, much of the attention on financial literacy is motivated by evidence from household surveys in developed countries that demonstrates a strong association between financial literacy and financial behaviors such as planning for retirement, borrowing at high interest rates, acquiring assets, etc. (Hastings, Madrian, and Skimmyhorn 2012). This is echoed in developing countries as shown by Cole, Sampson, and Zia (2011)'s finding that literacy is a strong predictor of financial activity in India and Indonesia. However, the high correlation between financial illiteracy and low savings does not necessarily imply causality.[8]

[7] In a 2009 study in the US, less than half (44%) of the people surveyed could answer five simple financial questions correctly, with women displaying significantly worse financial literacy than men (Lusardi and Mitchell 2009). In earlier publications, the same authors have shown that financial literacy is especially poor for those in low-income and low-education groups and among minorities (Lusardi and Mitchell 2007) and that fewer than 31% of women over 50 years of age reported ever having attempted any retirement planning calculations (Lusardi and Mitchell 2008). According to a 2009 survey, only one-third of respondents in the US could apply concepts of interest compounding or understand the workings of credit cards (Lusardi and Tufano 2009).

[8] A replication study of financial education in the US (Cole, Paulson, and Shastry 2012) found that although an extra year of schooling leads to a 7-8 percentage point increase in the likelihood of financial participation, this is due to enhanced cognitive ability rather than any specific financial literacy education as previously claimed by Bernheim, Garrett, and Maki (2001).

Investing in training and education programs that impart knowledge on financial products and concepts to those with limited exposure and training has received a lot of attention in the past decade. The evidence on the impact of intervening in this area is mixed. Several studies find significant positive impacts while others find no impact from months of training provided. Where financial education is measured to have significant effects, the challenge is to open the black box and understand the causal mechanisms behind the failure and success of specifically-designed financial training programs. This refers to both the internal mechanics of the decision-making process and micro-lessons (Drexler, Fischer, and Schoar 2011) as well as heterogeneity in impacts, depending on gender, social status, cognitive ability, external business options, etc.

Financial literacy training can refer to a diverse set of programs, varying from one-day consultation sessions in the field to one year of detailed in-class training. Determining how to teach financial concepts more effectively by varying the content, length, and complexity of the training, as well as the delivery channel, is critical. The education imparted varies greatly in its focus based on different target audiences – from education around individual and household financial decision-making, to education focused on the financial aspects of managing microenterprises. The case for paternalistic investment in financial knowledge is perhaps greatest when it comes to educating children and youth in the management of money, in preparation for their role as earning adults.

In an early comparison of price versus information as a barrier to saving in Indonesia, Cole, Sampson, and Zia (2011) find that offering a free 2-hour financial education program on the workings and benefits of bank accounts has no effect on the probability of opening a bank savings account for the general population, although there are modest increases in take-up among those with low initial levels of financial literacy, and low levels of education. In contrast, modest financial subsidies have much larger effects, achieving a nearly three-fold increase in take-up.

In a subsequent study, Carpena et al. (2011) use a randomized experiment to measure the effect of financial training in western India on three distinct dimensions of financial knowledge: (1) numeracy skills (e.g. computing interest rates), (2) basic financial awareness (e.g. bank account opening requirements), and (3) attitudes towards financial decisions (e.g. belief in insurance products). The sample for this experiment consisted of 1,200 urban households in Ahmedabad, half of whom were randomly allocated to receive video-based financial education. The baseline numeracy skill level among participants was low: around 50% could not answer a simple multiplication question correctly ("What is 3 multiplied by 6?"). To enhance motivation for learning, the researchers added a pay-for–performance treatment.

The households that received training and the comparison group took a follow-up test a few weeks later to evaluate impact on financial knowledge. The results show that financial education has limited effects in increasing financial numeracy (abilities to calculate and compare interest returns, insurance costs, or household income and expenses) even in the cases where individuals were provided with monetary incentives, implying that it is cognitive ability rather than lack of attention which prevented participants from succeeding. On the other hand, financial education did influence participants' awareness and attitudes towards financial products and the financial planning tools available to them, with basic financial awareness increasing by 7.7 percentage points relative to the comparison group. These results suggest that a financial education program that does not specifically address numeracy will have limited effectiveness in improving outcomes where calculations are necessary to make financial decisions.

In another study, also in western India, Field et al (2010) finds that giving financial literacy training to women working in the informal sector appears to have no impact on their probability of saving. The program involved running 2-day training sessions on financial literacy, business skills and aspirations for bank customers in partnership with SEWA (Self Employed Women's Association). They selected a random sample of 636 women from SEWA's customer base and randomly assigned two-thirds to be

invited to training sessions. When 597 of the initial sample were successfully surveyed at follow-up, they found that training did not increase savings, and only raised borrowing and business income among a sub-group of women who faced strict social constraints. The impact of financial training seemed also to be shaped by social norms and traditional institutions. The evaluation involved women from three distinct social groups – Muslim, Hindu Unscheduled Caste (UC), Hindu Scheduled Caste (SC). Muslim women – who face the most stringent religious restrictions—failed to benefit from the training program. On the other hand, among Hindu women, training increased borrowing by 13 percentage points and labor-market engagement by 25% for those in the UCs, who face more restrictions than women in the SCs. It appeared that for Hindu women, training was most beneficial to those who had been most constrained by social norms but Muslim women were so restricted that they did not have sufficient agency to benefit from the training by changing their activities or aspirations. The relationship between the level of social constriction and training impact was not monotonic.

In contrast, Seshan and Yang (2012) measures the influence of savings-focused financial literacy training on the financial decisions of Indian migrant workers in Qatar and their wives who were still based in India. The sample for this study comprised of 232 married, male Indian migrant workers based in Doha, Qatar, of whom 157 were randomly offered a short financial literacy training (3-hour workshop followed by 2-hour dinner), while the rest served as the comparison group receiving no training. Migrants' own financial practices, as well as their joint financial decision-making with their wives were significantly affected by the training. Migrants with below-median baseline savings were most responsive to the treatment, increasing both their own savings by 72.4% and the remittances sent to their wives by 13.8%, relative to the mean of the comparison group. The study also found evidence of substantial information asymmetries within transnational households. For instance, in households with low baseline savings rates, husbands reported significantly higher figures for their wives' savings rates compared to the figures that were self-reported by their wives. More recently, there has been a shift away from class-based training formats, toward including key financial educational components in the design and marketing of savings products directly to clients[9].

There may also be pedagogical lessons on the delivery of knowledge that are relevant from the related entrepreneurship training literature, given the extensive overlap between the set of "consumers" and "entrepreneurs" in developing countries and elsewhere: microentrepreneurship is prevalent, and enterprises are "closely held" by households. Most interventions discussed here evaluate training against no training. Few studies have systematically evaluated alternative channels and formats for delivering the same knowledge that might produce better or worse impacts in terms of learning and behavior. Drexler, Fischer, and Schoar (2011) tests the impact of simplified rules-of-thumb training compared to standard, fundamentals-based accounting training in the Dominican Republic. From a sample of 1,193, micro-entrepreneurs, 404 were randomly assigned to the rules-of-thumb training, 402 to the standard training, and the rest to a comparison group that received no training. They find that a rules-of-thumb training significantly increased the likelihood that clients keep accounting records, calculate monthly revenues, and separate business and personal accounts, with increases of 6 - 12% across these measures relative to the comparison group. On the other hand, those in the standard training group displayed no evidence of change in behavior or business outcomes.

An important aspect of evaluating the impact of knowledge on savings decisions is the relationship between information and social learning. Individuals often get their information on products and practices from those in their social circles. Their decision to implement a given practice may often be to conform with the social norm.[10] Intervening in this process of information acquisition and decision-making with a

[9] See Song (2012) for a recent evaluation on product-linked financial education in China around the marketing and direct sales of pension products.

[10] See Duflo and Saez (2003) and (Beshears et al. 2012) for evaluations of information gained through peer networks and impacts on enrolment in Tax Deferred Accounts and contributions to retirement savings in the US.

financial knowledge-providing intervention can either alter an individual's perception of the norm and their preferences to abide by it given the new information (choosing to be an informed outlier), or can alter the social norm and influence individual behavior to change to be in accordance with the 'new' norm.

2.4 Social constraints

Savings decisions primarily involve choices on inter-temporal consumption smoothing. Historically, the dominant mechanism for individuals and households to smooth consumption and respond to shocks has been to turn to the financial support offered by family and kin networks. These links are often informal, in that they are neither regulated nor enforced by any institution. However, the social bonds that link families together mandate certain norms of reciprocity that ensure a reasonable, though often incomplete, distribution of risk and accumulation among members of a family unit and a linked set of household units.

Such social links within and between household units can be enabling and/or constricting, and various studies have found evidence of both dynamics among the poor. Intra-household barriers to saving may be relevant if members of a household have different spending preferences. Inter-household barriers to saving may also be relevant if social norms necessitate that an individual provide support to friends and relatives if she is asked and has the cash on hand. In this section, we first discuss the evidence to date on the intra-household dynamics of bargaining and sharing between members of a household unit, with a particular emphasis on spousal relations, and the implications for savings behavior and outcomes. We then present the existing evidence on inter-household bargaining, discussing how the dynamics between different linked units within a social network (connected by kinship, friendship, or geographic proximity) affect savings behaviors and outcomes.

2.4.1 Intra-household bargaining and sharing

The key constraints to saving described in the previous sections are mediated by the social identity of different kinds of individuals and the dynamics between them. Financial decision-making within household units displays great nuance, and variations in the preferences of the male and female heads of households can have large effects on the savings and investment behaviors of the household, with important implications for savings product design.

There has recently been an increase in experimental work exploring decision-making within household units, particularly involving the male and female heads of households, as it relates to intertemporal choices such as savings behavior. Schaner (2012) studies the degree of matching in individual discount factors between husbands and wives, and its implications for household savings and investment behaviors. In this field experiment, 598 married couples in Kenya were given the opportunity to open individual and joint bank accounts at randomly assigned interest rates. They find that couples who are well-matched in terms of their individual rates of time preference make more intensive use of joint accounts, less intensive use of individual accounts, and respond to relative rates of return in a manner consistent with making an efficient investment. Poorly matched couples are completely insensitive to relative rates of return. The cost of savings misallocation due to such strategic behavior within the household is high, with poorly matched couples foregoing at least 58% more potential interest than well-matched couples.

Such differences in preferences between the heads of households have repercussions for how surplus is managed and whether and how much of it is consumed vs. saved for future consumption and investment. Robinson (2012) tests the effect of a random income shock on the expenditures of men and women within a household unit. For 8 weeks, 142 married couples in Kenya were given the opportunity of either partner being randomly chosen for a small income shock, i.e. the husband and wife each had a 50% chance of being chosen for this public income shock each week. They find that husbands increase their expenditures

on privately consumed goods in the weeks when they received a positive income shock, but not in weeks when their wives receive the additional income transfer. On the other hand, there is no significant increase in the expenditures of women either when they receive the shock or their husbands do.

In a similar lab-in-the-field experiment in Malawi, Gine et al. (2012) test how individuals within a household revise their intertemporal plans over time. They offer the household head and spouse in 1,071 households a series of independent choices on the allocation of a large sum of money (one month's wages) between 'sooner' and 'later' periods. A subset of households is allowed an unanticipated revision in their allocations at a date close to the payout date. They find that revisions in money allocations towards the present are significantly associated with present-bias in individuals, but they find little evidence to suggest that revisions of allocations towards the present are associated with spousal preferences for such revision, household shocks, or with the financial sophistication of respondents.

The pervasive use of informal savings arrangements outside the home such as ROSCAS and ASCAs, as a mechanism to buy indivisible goods (Besley, Coate, and Loury 1993), is considered in part a response to the dynamics of intra-household bargaining. In a quasi-experimental study in Kenya, Anderson and Baland (2002) proposes a model of intra-household conflict and evaluates data from 520 households in a Kenyan urban slum. The authors explore why the probability of a working woman living in a couple participating in a ROSCA is 74.4% while the corresponding participation rate for a working man living in a couple is only 9.6%. They find that the probability of participation in a ROSCA follows an inverted-U relationship with a woman's bargaining position within the household. At very low and very high levels of relative income share (proxy for bargaining power), participation levels and contributions to ROSCAs among married women are lower than at intermediate levels, when married women encounter resistance to pursuing and enforcing their saving choices within the home, given competing claims by their husbands for immediate consumption.

Another key question on intra-household dynamics relates to whether reducing transaction costs on savings accounts will always lead to increased savings. Schaner (2011) tests the differential effects of reducing transaction costs on savings behaviors and outcomes, when the savings account is owned and operated by either the male or female head of household individually, or jointly by both. Through the randomized issuance of free ATM cards to savings account customers in Kenya, the withdrawal fees on the accounts were reduced by over half ($0.78 to $0.38 per transaction), the accounts were accessible for withdrawals 24x7 through the ATM network, and the regulatory requirements to access the accounts for withdrawals were lowered (no requirement for in-person verification with a national identity card per transaction).

Reducing transaction costs through ATM card usage significantly improved savings rates by 40% and average daily savings balances by 16% for the accounts of male customers and accounts owned jointly by the male and female heads of a household. For accounts owned solely by women customers, however, there was an insignificant negative effect on account usage and balances from reducing transaction costs. Further, the positive result for male customers was concentrated in households where men scored higher than the median at baseline on a demographic proxy for bargaining power, while the negative effect for women was concentrated in households where women scored lower than the median on the same measure of bargaining power. Schaner estimates that just accounting for the differential in intra-household bargaining power reduces the gender differential in treatment effect by 77%.

The study implies that high transaction costs can serve as a commitment device for some individuals, especially those who have less power in controlling the use of their money within the household. They are able to ward off social pressures from their spouses to withdraw their savings by referring to the illiquidity and high costs of withdrawal from the account. On the other hand, for those with sufficient power to control the use of their money, reducing the cost of withdrawing money and making the savings account more accessible/ liquid makes them store more of their surplus in their bank account.

Ashraf, Karlan, and Yin (2010) similarly test how an explicit commitment savings product with withdrawal restrictions helps women negotiate the use of resources within a household. As a follow-up to the original study testing the offer and usage of a special 'Save, Earn, Enjoy Deposits' (SEED) savings account in the Philippines, in which customers voluntarily accepted to restrict their access to funds in the account until a certain target amount or target date was reached, they examined the long-term effects of the account on self-reported decision-making measures within the household and on household expenditure choices for male and female customers.

They find that usage of the commitment savings account leads to a significant increase in self-reported decision-making among married women customers having below-median decision-making power at baseline (by 0.14 standard deviations), and a significant increase in female-oriented durable goods purchased in such households (by 1457 Ph pesos). Women improved their perceived capacity to take decisions related to family, financial planning and consumption, when they were offered individual commitment savings accounts.

In a set of lab experiments in the field to explore spousal dynamics related to savings decisions, Ashraf (2009) randomizes the allotment of a sum of money equivalent to a day's wage to existing or previous clients of a bank in the Philippines. Participants could have this money directly deposited in their bank account, or receive the money as committed consumption or as cash. The participants and their spouses were then placed in one of three conditions that had different limitations on the privacy of information and the possibility of spousal communication. They find that men and women are more likely to deposit the money into their own account in the private condition, and commit it to consumption in the public condition, a result that is driven by those whose spouses make the savings decisions in the household.

Bargaining over financial decisions can be magnified in migrant households, where decision-makers are separated across large distances. Ashraf et al. (2010) examine whether conflict and information asymmetries in a migrant household lead to lower savings from remittances that migrants send home. The experiment then varies the degree of control over remittances by the emigrant household member, and measures the impact of how the remitted funds are expended in the home location. A sample of 898 Salvadorian migrants in the Washington DC-area were visited at home and advised to remit money into savings accounts in El Salvador. A randomly chosen quarter were then encouraged to open a savings account in a recipient household member's name, another quarter were encouraged to open a joint savings account that would have the recipient household member and their own name, and another quarter were encouraged to open both a joint account and an individual savings account in their own name in El Salvador.

Over a six-month period, they find higher take-up (by 21.7 percentage points) and higher savings in the project accounts (by $147) among emigrants given the greatest control over remitted funds, i.e. those accounts in which emigrants were offered an individual account in their own name at the recipient location, aside from the joint account with a recipient household member. The effect on increasing total savings of the transnational household is especially large and statistically significant for households in which remitters expressed a demand for control over remitted funds at baseline: savings for such households with demand for control was $1804 among those in the group offered the joint account and the individual account for the remitter compared to $938 in the comparison group.

Chin, Karkoviata, and Wilcox (2011) find very similar results for Mexican emigrants in the US. They randomize the allotment of ID cards to Hispanic individuals living in the US, which improved their likelihood of opening a bank account in the US by 38 percentage points, increased their US savings as a share of income by 9 percentage points and decreased their remittances to Mexico as a share of income by 6 percentage points. The results were heterogeneous, varying based on the self-reported level of control the migrants claimed to have over the spending of their remittances in Mexico. They find that for those who report having no control over the use of their remittances in Mexico (as opposed to shared control or

full control), offering the ID card caused the highest take-up of a US bank account, a larger increase in savings deposited over the five months following the intervention, a shift away from Mexico savings towards US savings, and an increase in income, compared to those who reported having some control. Access to savings does have significant welfare impacts, though mediated by intra-household control dynamics.

2.4.2 Inter-household bargaining and sharing

Most households across societies are embedded in networks of kinship or proximity through which they support each other when faced with unanticipated shocks or sustained consumption deficits. “Traditional solidarity networks usually pressure well-to-do households to provide financial support to their less fortunate relatives (see, for example, Platteau [2000])” (Anderson and Baland 2002). Specific alliances are formed through an assessment of the risks and endowments of different households so they complement one’s own household’s risks and endowments (Foster and Rosenzweig 2001). However, while these arrangements provide benefits such as interest-free loans and fully flexible repayments (Udry 1994), the support provided by informal insurance is often incomplete (Townsend 1994). And the support can sometimes come with strings attached on consumption and expenditure priorities that may not align with the household’s own preferences.

There is an extensive literature on risk-sharing and informal insurance among households, focused on transfers between individuals and households. We recommend Robinson (2012) for an overview of the research in this domain. New technology channels to facilitate digital payments may also increase the ability of those within a social network to transfer resources to one another in response to shocks, in a timely fashion and over larger distances (Blumenstock, Eagle, and Fafchamps 2011; Jack and Suri Forthcoming), perhaps improving the effectiveness of relying on informal networks.

What we are concerned with here is how such inter-household dynamics interact with the decision of households to maintain and grow their own savings. There are questions of which individuals in a network are approached to make transfers using their surplus. This is related to questions on the visibility of a household or individual’s wealth, people’s behavior in using their own resources when these resources are public or private, and the efficiency of saving and investment decisions based on the existence and public knowledge of a household’s surplus. Sharing norms may discourage individuals from exerting effort or accumulating assets, or encourage them to speedily spend surpluses before they are demanded by friends or relatives (Brune et al. 2013).

Poor individuals often are willing to pay steep prices to use more semi-formal or formal savings services that take their surplus funds outside the home and lock them away for future use, without being available for demands from social or family networks. Simultaneous saving and borrowing is commonly observed as one manifestation of this desire to lock away funds to prevent competing claims on accumulated surplus. Baland, Guirkinger, and Mali (2011) collects non-experimental survey data on 1,427 individual loans from credit cooperatives in Cameroon. They find that 19.5% of all members take out loans that are fully collateralized by savings held in the same financial institutions, and end up paying 13% of the total amount in net interest. They explore credit rating and time-inconsistent preferences as potential explanations for this behavior and reject the prevalence of these constraints in this context. However, from ethnographic work with clients who do over-borrow, they find support for signaling behavior in which clients use credit as a way of sending a message to their social networks that they are too poor to have available savings.

Jakiela and Ozier (2012) conducts a set of randomized experiments in the field in 26 rural communities in western Kenya to test savings and investment decision-making when the information on one’s endowments and returns are public to one’s social network. Participants received an endowment that they could divide between a risk-free savings account and an investment with some associated risk and profit.

They then randomly assign whether the amount invested in the risky but profitable venture is public knowledge or not. The prediction is that if expectant social networks are a serious threat, then participants will seek to reveal as little information as possible about their endowment and keep most of their funds in the less profitable but private savings account. A third treatment arm involves the option to pay a randomly-assigned price to keep the endowment hidden. The study measures outcomes for men and women separately.

The study finds that women who receive the large endowment treatment are 9.6 percentage points more likely to invest an amount no larger than the small endowment when returns are observable, corresponding with a 5.4 percentage point decrease in investment level. No similar trend is observed among male participants. Among women participants whose relatives were part of the experimental group to whom information was visible, there was a 40 percentage point greater likelihood to invest no more than the amount of the small endowment (a 22.1 percent lower investment when the investment income is observable compared to when it is hidden). Among participants given the choice of paying a price to hide their income, 30 percent of those able to afford the cost of hiding do so, which corresponds with an amount that is 15 percent of their gross payout from the experiment. They base their case for a 'rotten kin' theory on these measured patterns in inter-household social interactions.

In a test involving an assessment of self-control bias vs. 'other-control' problems, (Brune et al. 2013) randomizes access to ordinary and commitment savings products among 3150 smallholder tobacco farmers in Malawi organized into 299 farmer clubs. One third of the farmers' clubs in the study were assisted in opening ordinary savings accounts, another third were assisted in opening both ordinary and commitment savings accounts, and the final third served as the comparison group without assistance in opening either type of account. For the groups offered savings accounts, a subset of each was chosen to receive raffle tickets (some in private and some in public) that revealed their savings balance in their accounts, whose outcomes were measured against a subset of farmers that had the savings accounts but no raffle tickets that revealed this information.

Providing tobacco farmers in the sample with access to any savings account positively affected their savings level against the comparison group (significantly increasing total deposits by 21,596 MK and 21,861MK in the ordinary and commitment treatment arms respectively). However, the impact on welfare differed between the two types of savings treatments. The study found that the group that opened both a commitment savings account alongside an ordinary account saw a 9.8% increase in land under cultivation compared to the comparison group, 27.4% increase in agricultural input use during planting vs. the comparison group, 21.8% increase in crop output at harvest, and a 17.4% increase in household expenditures in the months just after the harvest. No significant increase in welfare indicators was measured for the ordinary savings account group.

A striking result from the study is that 89% of the savings deposited by those offered a commitment savings account (that led to the large welfare impacts) were in fact kept in the ordinary accounts held by these individuals. This indicates that the commitment mechanism is not working through the 'tying of one's hands' to resist self-control bias. An alternative explanation would involve a signaling explanation for this behavior, where the commitment savings account allows people the ability to better resist social network demands for their savings. However, there is inconclusive support for this explanation. The commitment treatment did not in fact see lower reported transfers to households. Further, the sub-experiment that involved the public revelation of savings balances did not lead to lower savings as expected, if claims from expectant social networks were in fact a major reason for people to choose to lock away funds in arrangements that made their funds accessible.

The evidence suggests that many individuals face a considerable need to prevent their social networks and family members from accessing savings, and are willing to undertake expenses to do so. In their study on reducing the cost of accessing a simple formal savings account in Kenya, Dupas and Robinson (2012a)

finds that the accounts had high take up and use (leading to significant increases in savings and consequently microenterprise investment) despite there being no interest offered on the savings balance and with withdrawal fees charged to take money out. One reason that the female street vendors in the study's sample chose to save in the formal savings account, in spite of the effective negative return on their savings, was because it reduced their available cash on hand and thus also the risk of appropriation by spouses or relatives. The negative returns of holding surplus at home would appear to be higher than the negative returns on saving in the formal bank account, which provides some indication of the costs of saving incurred from having expectant social networks.

Chandrasekhar, Kinnan, and Larreguy (2011) conduct a randomized lab experiment in the field with villagers from rural Karnataka in south India to understand how individuals' usage of savings devices interacts with the informal insurance arrangements they maintain with those in their social networks. The experiment involved participants playing variants of a consumption-smoothing game that tested the ability to smooth risk inter-personally and inter-temporally, along with testing limited commitment options to engage in risk-sharing with particular partners at varying social distance from oneself. Their sample consisted of 648 villagers from 34 villages, for whom they had full social network information at baseline.

They find that access to savings does not crowd out informal insurance for the average pair in the experiment, i.e. transfers do not decrease significantly when formal savings are available to each participant. Access to savings improves welfare, by allowing individuals to smooth some of their income risk inter-temporally that is not insured inter-personally. In the absence of savings, limited commitment to transfers seems to bind significantly when two individuals are socially distant in the network, but not when they are socially close.

2.5 Behavioral Biases

Saving is not always easy. For some, it requires overcoming behavioral biases such as temptation, inattention and inertia. The intersection of economics and psychology plays a key role in thinking about how to offer and structure savings products for the poor. There are several types of biases that can produce present-bias (under-saving and over-borrowing): biases in preferences (costly self-control, loss aversion and anticipatory utility); biases in expectations/perceptions of prospects (e.g., optimism); biases in price perceptions (e.g., exponential growth bias); and biases in whether and how to solve problems conditional on all other variables (inertia, limited attention, planning fallacies, etc.). Understanding these behavioral bases for intertemporal choice problems can help us recognize what is changeable and what is not in the way people think and behave, and design products and processes that work around human nature to help people save as they aspire to.

2.5.1 Costly Self-Control and Present-Biased Preferences

Problems of self-control abound in casual observation, all the way from the over-eating, to overusing the snooze button on an alarm clock. Part of individuals' inability to save is related to this "present bias," or the automatic tendency to attach greater meaning and importance to the present moment than other moments in time. When individuals disproportionally value consumption in the present moment over consumption in the future, they may be less likely to save, even when there are additional benefits to withholding consumption, such as the accumulation of interest on a savings balance, or ability to make a larger investment purchase later.

To save, people need to overcome the temptation of consuming in the present, and actively put money aside for a future use. "Dual-self" frameworks are helpful for thinking about such problems, problems where one's future-self has divergent consumption desires from one's present-self. Take for instance the case of a micro-entrepreneur; her future-self would like to save in order to grow the business' inventory

or invest in a new machine, but her present-self faces the temptation of using available cash to buy desirable goods, such as tobacco or extra tasty food. The existence of a dual-self with competing preferences makes saving difficult, and may help to explain why many people save less than they state they would like to. The literature on hyperbolic preferences (Laibson 1997), temptation (Gul and Pesendorfer 2004; Banerjee and Mullainathan 2010) and the dual-self model (Fudenberg and Levine 2006) provides an excellent framework to understand self-control problems in saving.

Self-commitment Devices

Problems of self-control or time-inconsistent preferences, and temptation or dual-self issues, prevent many individuals from realizing their savings goals. To help overcome these problems, individuals may engage in various formal and informal self-commitment mechanisms. This section reviews self-commitment devices—the arrangements that people voluntarily make in order to formalize and attain their savings goals, which otherwise may have been difficult to achieve due to intra-personal conflict. As argued in Laibson (1997) and Fudenberg and Levine (2006), such arrangements can help individuals overcome self-control problems by constraining one's future actions, as well as overcome pressures on individuals' surpluses from demands by their social networks or their household members with different spending preferences, that they do not wish to fulfill.

Commitment devices can take several forms. Commitment devices that call for real economic penalties for failure, or rewards for success, are referred to as **hard commitments**, while devices that have primarily psychological consequences are considered **soft commitments**. This is really a spectrum, though, not a clear and always easy to assign binary characteristic. A hard commitment device may take the form of a formal commitment savings account where interest is forfeited if a monthly deposit is not made, or an agricultural savings account in which withdrawals before a pre-set target date corresponding with the sowing season incur a substantial penalty. A soft commitment device might be a separate account labeled "School Fees" where the depositor incurs the psychological cost of guilt or shame when withdrawing funds for non-education expenses. Default settings can serve as soft commitments for future choices using the power of inertia, as we discuss in section 2.5.3. However, while effective in some contexts, for example in increasing participation in retirement programs (Choi et al. 2004), in the case of self-control problems, personal weakness, or spousal demands, stronger commitment devices might be more effective. Hard commitment devices are those that actively restrict people's actions and call for real penalties for failure, or rewards for success.

One of the first tests of a formal commitment device in a developing country setting involved the introduction of a savings account that restricted withdrawals until either a future date arrived, or until a certain level of deposits were reached. By restricting access to cash, the future-self tied the hands of the present or myopic self. This idea was applied and evaluated in Ashraf, Karlan, and Yin (2006a), in collaboration with a rural bank in the Philippines. The bank created a savings product called SEED (Save, Earn, Enjoy Deposits) that offered the choice of two commitment features to a sample of existing clients of Green Bank: either a time-based maturity, in which the account balance would become available only at a specific future date (such as the time of a wedding or celebration), or an amount-based maturity, in which funds would become available once a certain goal was reached (such as the money needed to repair a house). The clients could freely choose to apply either of these restrictions on their accounts. However, once the decision was made, SEED clients could not withdraw funds until they met their chosen goal. Clients were also given the chance to opt for a lock box to make deposits at home, before bringing them to the bank.

The SEED accounts offered reduced liquidity for the borrower, but no other compensating interest or financial incentive. Nonetheless, take-up was high, with 28 percent of individuals opening an account. After one year, individuals offered accounts increased savings balances by roughly 411 pesos or 81 percent, relative to the comparison group that only received marketing material around the benefits of

saving unrelated to this account. Among the subgroup of individuals who actually opened the account, savings balances increased by roughly four times this amount, with clients increasing their savings by over 300 percent relative to the comparison group. In line with the self-control theory, individuals identified as time-inconsistent were the ones most likely to show a preference for and benefit from commitment. The longer-term impact of the product on savings balances over a two and a half year period was a 33 percent increase, which was no longer statistically significant (Ashraf, Karlan, and Yin 2010). However, this can be interpreted either as a lowered savings rate, or as the savings having been withdrawn and converted into a lumpsum expenditure that improved welfare. The bank did not engage in any continued marketing, even to the clients who used the account. This shows that although the product achieved medium term goals, it did not cause lasting behavior change of the same magnitude; to achieve that, one may either need to reinforce the commitment, or it could be that the same medium term behavior was deemed not optimal by the clients and they reverted after proper analysis.

Formal savings accounts with restrictions on withdrawals are one form of a hard commitment device, which may be successful in part due to the fact that the onus of restricting access to one's own money falls on a formal financial institution with whom there is a legal contractual obligation, rather than on the individual. However, in many cases, soft commitment devices that do not impose a penalty but do provide some motivation or positive incentive to follow a certain pre-set commitment, can be very effective. Similar to the accounting practices performed by most organizations, individuals often have a process of recording, remembering, and summarizing financial transactions. These processes, as described by Thaler (1980), are called mental accounting. One example of mental accounting is assigning actions or valuations to specific accounts. Individuals create separate accounts for different spending categories and then allocate their spending based on implicit or explicit individual account budgets and balances. The idea of mental accounting can be embedded into financial product design with potentially positive effects. For example, labeling formal savings accounts with specific goals can help overcome inattention problems by increasing the salience of a specific future expenditure and attracting the saver's attention to her long-term goals.

In contexts where formal financial services are less accessible (or less convenient), several informal or semi-formal commitment arrangements have been found to be successful in helping the poor fulfill their desire to save for specific purposes. Many poor individuals already save for large expenses through informal means. In Sub-Saharan Africa, Rotating Saving and Credit Associations or ROSCAs are a common example of informal savings arrangements, where a group of individuals make regular cyclical contributions to a fund, which is then pooled and given as a lump sum to a different member of the group at each meeting. Recent studies reveal very high participation rates in such informal arrangements; across Sub-Saharan Africa, average membership among adults ranges between 50 and 95 percent (Anderson and Baland 2002).

It is useful here to mention a qualitative study by Gugerty (2007) that looked at the motivations behind the formation of ROSCAs by examining the operation of 70 such groups across western Kenya, to assess whether economic theory and prior studies were accurate in suggesting that the motivation for establishing ROSCAs only related to saving for lumpy expenditures, responding to intra-household conflict, or providing insurance. She instead found support for the hypothesis that the motivation to join a ROSCA was more likely to be a response to self-control problems: in the absence of alternative commitment devices, ROSCAs provide a collective mechanism for individual self-control in the presence of time-inconsistent preferences. The design and rationale behind these 70 ROSCAs was consistent with this commitment hypothesis and this mechanism was echoed by many of the ROSCA participants who self-reported that they had joined ROSCAs to give themselves "the strength to save" on the basis of their

experience that one "can't save alone"[11]. Naturally, learning from one's peers need not always imply shifting towards better behavior.

Related to the idea of a commitment device is the important qualification of how binding the commitment needs to be, and how binding it turns out to be in practice, in promoting future-oriented saving behavior. Using members of existing ROSCAs as their sample, (Dupas and Robinson 2012b) design a randomized evaluation in rural Kenya to test four innovative savings devices offering varying levels of commitment aimed at helping households save more for health expenditures. In two treatment groups, individuals were given a locked metal box for saving at home. In the *Safe Box* group, individuals were given the key, thus the technology provided only a very soft form of commitment through labeling (a form of mental accounting), but did not provide any commitment to make deposits or limit withdrawals for non-health purposes. In the *Lock Box* group, individuals were not given the key, and had to call the program officer to open the box. Once opened, the money was meant to be used to buy health products. The *Lock Box* product therefore offered stronger commitment through earmarking of funds.

In a third group, individuals were encouraged to save in an individual *Health Savings Account* that would be held at the ROSCA and earmarked for *emergency* health expenditure only. In a fourth treatment group, individuals were encouraged to use their existing ROSCA to create a *Health Pot,* in which members would contribute an additional amount during regular meetings earmarked for health products only. The *Health Pot* offered a much stronger form of commitment than the individual savings technologies, as it facilitated social pressure to actually make deposits. The *Health Pot* therefore featured social commitment to make deposits, on top of the earmarking and storage functionalities of the other treatments. The experiment thus was aimed at looking at the impact of these various savings tools on asset accumulation for a critical welfare goal (good health), and hoped to estimate which types of people benefit most from each.

Take-up of all four savings technologies was very high – between 66 and 97 percent – suggesting that the primary appeal of the devices is their common feature: providing a safe and designated place to save money for a specific goal, and to protect money from others. The main mechanism through with the products increased health savings was by facilitating allocation of the savings to a specific use, a form of mental accounting called labeling (Thaler 1999). Once money was set aside, individuals were better able to avoid "unplanned expenditures," including transfers to social networks, and non-essential spending.

After 12 months, investments in preventative health products increased by 66 to 75 percent in the *Safe Box* group and by 128 to 138 percent in the *Health Pot* group. Unsurprisingly, the *Health Savings Account* (which was aimed at emergency expenditures) had no effect on preventative health investments, however, interestingly, the *Lock Box* had no effect either. This suggests that the liquidity cost of holding money for specific health prevention purchases in the Lock Box (in the face of other unexpected income shocks) outweighed the benefit of earmarking for the average individual. By contrast, individuals in the *Health Savings Account* were significantly less venerable to unexpected emergencies, and were 12 percentage points less likely to be unable to afford medical care, on a base of 31 percent in the comparison group. Importantly, the impact results around varying kinds of health investments were nuanced. Earmarking savings for preventative health expenses was ineffective for the average individual, while earmarking for health emergencies increased people's capacity to cope with health shocks. The former imposed too restrictive a liquidity constraint, especially given that the most valuable use of saved funds was to cope with emergencies.

[11] See Kast, Meier, and Pomeranz (2012) for an evaluation of self-help peer group enforcement among microcredit clients in Chile. They find a three-fold increase in savings deposit frequency and a two-fold increase in savings balances from peer group enforcement.

The results confirm the presence of all three types of savings barriers. First, inter-personal barriers were substantial - those who were previously giving assistance to others without receiving assistance in return benefited more than others. Second, intra-personal barriers also matter. Those whose savings preferences were not constant over time (as measured by survey questions) were not able to benefit from the Safe Box (because it was too easy for them to access the money). They also did not benefit from the Lock Box – this is because even though the savings in the box was illiquid, there wasn't a strong incentive to actually put money into the box in the first place. However, they did benefit from the stronger commitment and social pressure to make deposits that was provided by the Health Pot. Third, there is some evidence of intra-household barriers. The effects of several of the interventions were larger (though not statistically significantly so) for married individuals.

A key consideration to keep in mind when assessing commitment savings products is how the specifications of the product and the severity of the commitment interact with an individual's time preference and self-control bias. A 100% take up rate for a stringent hard commitment savings product may in fact be a welfare-reducing outcome, given that some individuals may not require the sanction of penalties and the loss of liquidity to attain their goals, and may benefit from less restrictive prompts. Ashraf, Karlan, and Yin (2006a) see a take-up rate of 28% of the hard commitment product, while Dupas and Robinson (2012b) see higher take-up rates for their range of commitment products from 66-97%. Assessing the fit between an individual's commitment constraint and the appropriate product to alleviate that constraint is key, and more work on analyzing the heterogeneous effects of various commitment products on different kinds of users for different target welfare expenditures will help us move forward with more nuanced product design and marketing.

Under the premise that problems of self-control and time-inconsistent preferences (where individuals discount future consumption at a higher rate and over-consume in the present) can cause individuals to make sub-optimal consumption decisions, commitment devices have also proven effective in several contexts outside of savings, including helping individuals overcome addictions, manage weight & fitness targets, and optimally time investment decisions to correspond with cash inflows[12]. As discussed here, self-commitment devices to improve savings inhabit a wide spectrum from peer groups (Village Savings and Loan Associations, Self-Help Groups, etc.) to more formal variants that take the form of defined contribution pension plans, mortgage payments, and additional tax withholdings, and websites like StickK that allow individual commitment contracts to be set and enforced. This is a ripe area for replication and scale-up efforts given the rigor of the evidence base.

2.5.2 Biases in Expectations (of prospects and prices)

There is growing policy and programmatic concern that many people overborrow (and hence undersave) because they are overly optimistic about their ability to service the debt post-disbursement (see, e.g., Mann 2013). The little related literature we know of is focused on the U.S.[13] The literature from psychology also demonstrates a number of cognitive limitations in expectations around valuation, for instance comparing prices at different points in time. A key example of this is Exponential Growth bias, which is the propensity to linearize exponential functions when attempting calculations. Consumers with exponential growth bias underestimate how quickly interest rate compounds, which in turn generates future value bias - a systematic tendency to underestimate a future value given a present value, time

[12] See Gine, Karlan, and Zinman (2010) for an evaluation of a commitment device to quit smoking in the Philippines; Duflo, Kremer, and Robinson (2011) for a study of a commitment device enabling farmers to prepay for fertilizer, right after the harvest when they had cash on hand that led to increased fertilizer adoption in Kenya; and Barrera-Osorio et al. (2011) for timing cash transfer payments to coincide with school enrolment and educational payments in Colombia.

[13] For theory see Brunnermeier and Parker (2005) and Heidhues and Koszegi (2010). For some related empirical evidence see Skiba and Tobacman (2008) and Bertrand and Morse (2011). See also Puri and Robinson (2007).

horizon, and rate of return[14]. This can impact savings-related decision-making with more-biased people saving less because they underestimate the future value of savings.

In a promising recent study, Song (2012) investigates the impact of financial education, with a particular emphasis on calculating compound interest, on pension contributions in China using a randomized experiment. A sample of over 1000 households in the Shaanxi province were randomly selected to be given financial education, in which some were taught about the principles of compound interest and others were provided expected levels of benefits for differing levels of contributions without compound interest being fully explained. It was found that the group where compound interest was emphasized had 37-40% higher contributions than the comparison group, whereas the training without an emphasis on compound interest had less than half the effect, with contributions of approximately 17-19% more than the comparison group.

2.5.3 Biases in Problem-solving

A third category of biases relates to whether and how individuals solve problems conditional on all other variables. For instance, Buehler, Griffin, and Ross (2002) demonstrate the existence of a 'planning fallacy', in which individuals underestimate the amount of time needed to complete tasks. Forsyth and Burt (2008) experimentally find evidence that asking individuals to list sub-components increases accuracy. Savings decisions are as susceptible to being poorly optimized due to these problem-solving biases, which include most prominently a bias towards maintaining the status quo (inertia) and having information relevant to the present be most salient in one's mind (limited attention). We address each of these below.

Status quo bias and default settings

Inertia is powerful. People can plan to change, but one of the best predictors of our future behavior is our current behavior. The status quo bias is a cognitive bias; an irrational preference for the current state of affairs. In other words, people tend to be biased towards doing nothing or maintaining their current or previous decision. The current baseline (or status quo) is taken as a reference point, and any change from that baseline is perceived as a loss.

Soft commitment devices, for example, take advantage of the power of inertia by using default options to nudge people into taking a certain decision. Status quo bias implies that if someone changes the default of a future savings decision, their future decisions will likely change. Product design based in soft commitments such as default settings can take advantage of the status quo and provide a powerful and cheap (often free) way of changing behavior.

By eliminating the transaction costs involved in taking a particular decision or action, automatic enrollment has been shown to be effective in nudging people towards a particular decision. A common example applied in many countries is automatic enrollment in organ donations. Countries that adopted an automatic enrollment strategy have considerably larger consent percentages than countries that require explicit consent (Johnson and Goldstein 2003). Automatic enrollments have also been popularized in the context of retirement savings programs, where a number of studies have established the significant improvement in old-age savings accumulation based on default settings during a person's working years.[15] As yet, there is little evidence on the power of defaults in improving savings in developing country settings[16].

[14] See Stango and Zinman (2009) for related US work on exponential growth bias. See Levy and Tasoff (2012) for a lab experiment testing the theoretical predictions of exponential growth bias.

[15] See Choi et al. (2004) and Madrian and Shea (2001) for evidence on the effectiveness of default settings in improving enrolments and contributions rates to retirement saving (401(k)) programs in the US. Benartzi and Thaler

Some status quo biases can be overcome by offering a switch to a preferable option at the right time. Opting out of the improved option once the default is switched then proves to be costly due to our bias towards inertia, encouraging people to follow through with the better option[17]. In Colombia, Barrera-Osorio et al. (2011) look at a traditional CCT program in an urban setting and evaluate a modification of a traditional conditional cash transfer program, in which one third of each of the regular conditional cash transfer payments was delayed and paid as a lump sum when the student had to pay school fees for the next year ("savings treatment"). A further adjustment to the program allowed older students to access their deferred graduation payment earlier if they enrolled in tertiary institutions ("tertiary treatment"). There were in total 5,976 students participating in the basic cash transfer and savings experiment and 1,182 in the tertiary education treatment. The researchers found that deferring regular transfers did not decrease attendance and that students who received a large cash transfer right before annual school fees were due were 4.5 percentage points more likely to re-enroll than students who received no transfer, and 2.8 percentage points more likely to re-enroll than students who received regular transfers. The savings treatment and the tertiary treatment significantly increased enrollment at tertiary institutions by 9.4 percentage points, and 48.9 percentage points respectively, whereas enrollment among the basic cash transfer group was positive but not significantly higher than the comparison group.

Inattention and Reminders

Inattention is a key behavioral bias that can lead people to under-save, or over-save. To generate under-savings, future expenditure opportunities or changes in income patterns may not be as salient as current consumption needs. Individuals may receive ongoing reminders about consumption, borrowing, and loan repayment needs—most likely because outside parties have clear incentives for doing so. However, individuals are much less likely to be reminded about saving requirements.

If individuals are distracted and fail to take into account significant future expenditures in their present consumption decisions, such as paying school fees or making business investments, they are likely to over-consume in the present. Instead of smoothing consumption and saving small amounts on an ongoing basis, inattention can mean individuals are caused to make financial decisions, at the time of the payment or expenditure that are less-preferred, such as significantly reducing consumption, borrowing money, or defaulting (Karlan et al. 2011).

Inattention may take several other forms. It can be manifested, for example, in individuals failing to remember information that predicted future income (Mullainathan 2002). If memory is distorted, a transitory spike on income may evoke other positive expectations, and lead individuals to overestimate future income, and thus over-consume in the present. Similarly, inattention may cause individuals to mistakenly focus only on information that they consider relevant for a specific prediction task (Schwartzstein 2010). Selective attention, or the act of narrowing attention to what is believed to be informative for a task, affects our learning process and might lead us to persistently fail to identify important regularities, make biased forecasts, and hold incorrect beliefs. Often, what is most salient is not what is most relevant or important to the decision at hand[18].

(2004) evaluation of SMART also takes advantage of a default setting once the commitment to set aside a portion of future bonuses is made by the employee. See Chetty et al. (2012) for a comparison of price changes (via subsidies) versus default contribution levels on retirement savings in Denmark.

[16] See Atkinson et al. (2012) for a recent study on the impact of default contribution rates, and to a lesser extent planning and reminders, on savings behavior among microcredit clients in Guatemala.

[17] See Duflo, Kremer, and Robinson (2011) for an example of this design in having smallholder farmers commit to pay for next season's fertilizer input at harvest time.

[18] The problem of inattention is not exclusive to savings and has been studied in the lab (for a review, see DellaVigna 2009); also see Chetty, Looney, and Kroft (2009) on how inattention influences people's consumption decisions when taxes suddenly become more salient, Hossain and Morgan (2006) on inattention to the equivalence

While transaction costs, fees, and interest rates are relevant variables to consider when making the decision of whether to open a savings account or borrow from an MFI, the choice and use of financial products can potentially be determined by seemingly less relevant factors such as advertisements, reminders, peer enforcement and labeling, simply because of how they draw our attention. Here, it is important to note that limited attention can distort inter-temporal allocations of resources in a way similar to self-control models. When people overlook future expenditures, they will over-consume today. This prediction relies on asymmetry between expenditure and income: individuals must be more likely to forget future expenditures than future income. Under this assumption, limited attention can create the same present-bias toward consumption found in self-control models. However, limited attention also generates a prediction distinct from self-control models. For example, if inattention explains people's underinvestment behavior, then strategies that utilize reminders, information and advertising could affect attention and therefore savings, without affecting the self-control problem, except in cases where an intervention influences both shortcomings such as peer group support.

If individuals' under-saving behavior can be explained by lack of attention, providing reminders to save may offer a straightforward solution. Reminders could increase savings by heightening the memory of a future expense or change in income, which may help individuals optimize their consumption decisions over time and potentially save more. Further, targeting the content of the reminder to reference specific goals may be more effective than a simple reminder about the general need to save. Karlan et al. (2011) test these two hypotheses in three different settings: Bolivia, Peru and the Philippines.

In all three settings, the evaluation started with individuals opening a bank savings account, defining a savings "goal" to achieve in a year, and making plans for monthly deposits. Each site then had minor variations in the test for the impact of reminders: a commitment feature was tested in the Philippines site in which clients could not withdraw funds from the account until they reached a pre-set savings goal; in the Peru site, the bank asked clients for a specific future expenditure goal and offered a reward to clients who stuck to their plan; and in the third site in Bolivia, there was a reward offered to clients who fulfilled their plan but without any commitment or expenditure goal. Across this sample, individuals were randomly assigned to receive a monthly reminder via text messages or letter, or to a no-reminder comparison group. In both the treatment and comparison groups, individuals were also offered a reward—a higher interest rate—for sticking to their plan. In Bolivia and the Philippines, reminders were sent via text message, while in Peru, reminders were sent via letters due to the low level of cell phone penetration. Pooling across the three settings, individuals who received reminders deposited more than the comparison group. Reminders increased the total amount saved at the bank by 6 percent and increased the likelihood that individuals reached their saving goal by 3 percentage points (6 percent).

To assess whether linking reminders to specific goals could increase the salience of the reminder, and therefore the impact on saving behavior, the evaluation in Peru also included a variation in the content of the reminder. Some individuals in the reminder group were randomly assigned to receive a letter that focused on a specific expenditure goal, which the individual had selected from a list of pre-established categories (such as, purchasing a moto-taxi or household equipment, starting a business or paying for social and family events). Expenditure-mentioning reminders were significantly more effective than those that merely mentioned savings, increasing savings by an estimated 16 percent relative to the no-reminder comparison group.

These results from Bolivia, Peru and the Philippines suggest that reminders can be an effective strategy to help address the problem of inattention in saving behavior, or other financial decision-making. The impact here could be driven by the effect of the reminder in increasing the salience of this action.

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of price with varying explicit and implicit components, and Dellavigna and Pollet (2009) on the lower impact of bad financial announcements made on Friday on stock prices.

However, clients could also actually have found the content of the messages informative in their own right, which might indicate that the lack of information is the problem that the message addresses. A placebo message with altered content might address this concern in future evaluations, to separate the effect of the message as a reminder from the effect of the message as new information, as we discuss in section 4. More research is needed to understand how to best target the timing and content of reminders to maximize impact on savings. Further, sending reminders via text message has a near-zero marginal cost, suggesting that this reminder strategy could be a cost-effective way to increase private savings, and a viable commercial strategy for banks. Indeed, the partnering financial institution in Bolivia, Ecofuturo, has continued sending text message reminders.

While product design innovations such as withdrawal restrictions, labeling and default settings have been found to be effective in increasing savings, such devices may be unavailable to millions of individuals who do not have access to formal financial services. Self-help peer groups, on the other hand, are an alternative device offering commitment and reminder features that could be particularly salient in environments of low formal financial service penetration. Social interactions may help individuals overcome problems of inattention, and potentially self-control, by reinforcing the importance of saving or the specific reasons to do so through ongoing reminders whether in-person or otherwise, and by providing a support network to help individuals meet their stated goals[19].

Broadly speaking, the usefulness of providing reminders (via text message or otherwise) has two clear channels for effectiveness: First, reminders can increase the salience of a particular issue (i.e. a significant future expense), and second, can encourage adherence to doing a behavior consistently over time (i.e. making regular deposits towards a future goal)[20]. Thus, the content and framing of the reminder, as well as the persistence of delivery, are critical features to consider when designing a reminders intervention[21].

Limited attention can distort inter-temporal allocations of resources in a way similar to self-control models. Either by failing to recognize a future expenditure, or by allowing the present-self to dominate the other-self in consumption decisions, the presence of such behavioral biases can result in sub-optimal levels of savings. It is important to note that while problems of limited attention and self-control create similar challenges, it is not always possible (or preferable) to address these problems with similarly strategies. Reminders, as shown by Karlan et al. (2011) and others, can be effective in directing individuals' attention towards the importance of saving, but if individuals still lack self-control, reminders alone are unlikely to provide a complete policy solution. Successful policies to address low-savings must therefore be designed with an understanding of the source of the behavioral bias in mind, and programs that address multiple biases in combination may be most successful.

Inattention can also be manifested as the failure to identify financial opportunities. In the context of savings, product design can address inattention by making the benefits of savings more salient and thus more attractive than instant consumption. One mechanism to do this is through advertising. By either

[19] See Kast, Meier, and Pomeranz (2012)'s experiment among microcredit clients in Chile comparing the effect of the in-person interaction and social pressure of peer groups versus the effect of simply transferring information on a regular basis.

[20] Text message reminders have been successfully evaluated in many domains: Miloh et al. (2009) used text messages to remind recipients of liver transplant to take their medication and found improvement in medication; Armstrong et al. (2009) found that sending daily text messages reminders increased individuals' reported daily sunscreen use by 26 percentage points.

[21] See Stango and Zinman (2012) for an evaluation of how overdrafting in the US can be affected by small shocks to customers' attention (in this case timely invitations to participate in online surveys about financial services); each overdraft-related survey taken within a two-year period reduces the probability of paying an overdraft fee by a further 1.7 percentage points, over and above an average 3.7 percentage points impact of the first invitation to participate in the survey.

providing information about a product or service, or persuading with non-informative content, advertising has the potential to influence consumers' decisions[22].

Individuals may often not be responding as much to price or information directly, as to the simplicity of the nudge or message. As seen in Cole, Sampson, and Zia (2011), financial incentives were successful when they were offered as a straightforward cash transfer, but less effective when they required the customer to make calculations about the value of future interest.

Even if financial opportunities are identified, inattention could cause individuals to miss deadlines and the chance to take advantage of a beneficial offer. The timing of an offer could therefore influence how an individual responds to it, however the effect of longer versus shorter deadlines is not clear from theory. One plausible theory suggests that offers with longer deadlines could reduce demand by giving individuals more opportunity to delay take up indefinitely, while shorter deadlines might provide less opportunity for procrastination[23].

3. Measurement and Methodological Issues

The measurement and methodological issues around savings are important to understand, in order to precisely assess what each evaluation of an intervention to address undersaving can teach us, and what it cannot. We provide a brief overview of each in this section.

Measurement Issues

The problem of aggregation: Savings take different forms. People save through bank accounts, put money under the mattress, buy investment goods or purchase inventory for their business. An observed increase in the balance of savings accounts could be offset by a decrease in other savings instruments with no overall effect on the level of savings (Chetty et al. 2012). Thus, estimating savings accurately requires measuring different forms of savings, some of which are easier to measure and with less noise (e.g. bank administrative records) and others of which are much more difficult to identify and are recorded subject to higher measurement error (e.g. self-reported data on total savings).

The problem of levels: Many poor people could in fact be saving actively even if asset levels are low (Collins et al. 2009). Unlike credit inflows, which can be sizable relative to household income, savings flows can be quite small, and balances accumulate slowly. For smaller flows, there is the compounded difficulty of poor recall since they tend to be less salient when people respond to questions on a survey compared to large inflows and outflows.

The problem of timing: Households typically accumulate savings over time until they need to withdraw a larger amount. The timing of measurement, for example, right before or after a large withdrawal matters. Having a more representative picture of the level of savings require measuring savings balances at multiple points in time.

[22] See Bertrand et al. (2010) for a seminal study in South Africa with consumer credit clients on the impact of persuasive advertising on credit behaviors. Choi et al. (2012) also recently demonstrated how small savings cues (providing anchors, goals or labels) provided in email messaging can have large impacts on retirement savings behavior in the US.

[23] The Bertrand et al. (2010) study also looks at the role of limited attention in demand sensitivity to deadlines by randomly varying the expiration date of the loan offer. Findings give little evidence to support the procrastination hypothesis: demand for loans and the probability of applying early are unaffected by the offer deadline.

The problem of interpretation: If someone reduces consumption little by little and then buys a durable good with the savings, we are more likely to measure successfully the durable good than the consumption reduction. When the durable good is an investment, i.e., income-generating, one can at least compare discounted consumption and, determine under what discount rates the household welfare increases. When the durable good is a consumption item, however, the welfare implication typically resorts to assumptions using revealed preferences.

***The problem of accounting*:** Increased savings flows into one savings vehicle must come from somewhere. There are only four possibilities: (a) lower consumption, (b) increased debt, (c) lower savings elsewhere, (d) increased income. Welfare considerations depend critically on understanding where the funds came from. The worst case scenario, for instance, is someone who saves more by borrowing more, and pays more interest on their debt than they earn on their savings (as is typical in most situations). Yet, for reasons just stated above, this is not always so easy, as savings flows are often in small amounts, and may require asking in recall. Or, savings could come from informal savings, which are difficult to measure as well.

Methodological Issues

Impact evaluations of interventions to improve savings have posed different questions, and can be categorized into three types:

- *Formal versus no formal savings*: Facilitate access to a particular savings account and then compare outcomes for those with and without that savings account (Dupas and Robinson 2012a; Prina 2013).
- *Product design tests*: Change the design of a savings product, thereby exogenously increasing savings balances -for example though a commitment device- one can compare the difference in outcomes between groups with different level of savings (Ashraf, Karlan, and Yin 2006a; Brune et al. 2013).
- *Non-product interventions that aim to change savings behavior*: This includes "nudges" such as reminders to save, as well as financial education, or simply altering the timing at which conditional cash transfers are delivered (Barrera-Osorio et al. 2011).

The use of each approach is often dependent on the constraints of the site for the field experimental evaluation. There are trade-offs to having more comprehensive data on a range of welfare impacts from a savings intervention, compared with having less noisy data on a subset of more narrowly-defined outcome variables.

4. Conclusion

The evidence on the impact of expanding savings access is promising and spans the range of development goals, from impacting empowerment and decision-making (Ashraf, Karlan, and Yin 2010), increasing resistance to health shocks (Dupas and Robinson 2012b), promoting entrepreneurial investment and activity (Dupas and Robinson 2012a), all the way to increasing agricultural investment and production (Brune et al. 2013). The jury is still out on whether and why (certain) households under-save, but our reading of the evidence suggests that it is well worth pushing forward on these lines of inquiry.

Going forward, we think it is critical to mesh basic and applied research. Under-saving, and its causes, are hypotheses that still need to be tested and refined. The development of efficient innovations and interventions is difficult without a sufficiently deep understanding of household decision making, market functioning and frictions, and the interactions of the two. The broad interest in the microfinance world in

expanding access to savings products, and the development of technology-based solutions for delivering products and communicating with customers, affords researchers with unprecedented opportunities to create and implement theory designs that build theory-testing into the evaluation of innovations or interventions that seek to drive savings behavior.

One approach to this is to develop testable predictions around heterogeneous responses to savings treatments. Prior work suggests that gender, intra-household decision power, risk preferences, and discount rates are all important mediators of treatment effects, and further theory and evidence is needed to flesh out how to best match different types of peoples, households, and businesses with different types of savings and investment vehicles.

A closely related approach is to focus on specific potential barriers to saving, design "treatments" to chip away at these barriers, and then evaluate the effectiveness of these treatments. Taking our five broad classes of potential barriers or constraints as a guide, we offer several examples of avenues for future work.

Transaction Costs

We need more testing of the marginal effects of yields within the range of market rates. There has been more work on the effects of substantial subsidies, but surprisingly little if anything on the long-term effects of such subsidies, which is critical to know because the efficiency argument for such subsidies hinges on habit formation. There is also much to learn about whether and how prices interact with attention; e.g., do good deals do a kind of "double-duty" by making other benefits of saving more salient? The development and spread of mobile platforms offer tremendous opportunities to test such questions in controlled settings that also consider the effects of, and interactions with, time costs.

Lack of Trust and Regulatory Barriers

Qualitatively, the lack of trust is self-identified by non-users of formal financial services as a barrier to saving in formal accounts. Little is known about how to address this, how different marketing, or product design, may help ameliorate such issues. Similarly, can better information on deposit insurance requirements and other prudential norms improve poor clients' trust in the formal banking system? Can trust in formal financial services be improved through better use of referrals through trusted peers or community actors in existing social networks?

Regulatory barriers, especially in identification and administrative requirements, also pose a major barrier to formal saving by the poor. Reducing the costs associated with fulfilling know-your-customer (KYC) requirements has the potential to lead to significant improvements in take-up and subsequent usage of formal savings. The reduced KYC norms around mobile money-based savings products, such as M-Shwari in Kenya, are a good example of this change. A number of recent studies highlight the rapid rise in mobile phone adoption and airtime transactions in African countries and the low regulatory barrier to entry that was a key ingredient in this transformation (Jack and Suri Forthcoming; Aker and Mbiti 2010; Davidson 2011). The costs associated with regulatory barriers seem likely to change, with more mobile money channels and services expanding across the world. How then does the use of new transaction channels, through distributed agents and centralized information systems, allow for and enable new low-cost methods of financial transaction monitoring and enforcement that in turn, can require fewer upfront regulatory requirements without increasing banks' risk exposure?

Information and Knowledge Gaps

Financial education programs have been found to improve awareness of financial products. However, there is less evidence on changes in cognitive biases or abilities from such interventions. The evidence on the impact of financial education programs on savings behaviors has been mixed, with significant positive

results in a few studies and no impact in some others. The simplification and condensation of financial educational content, into less theoretical and more pragmatic rules-of-thumb instructions, has shown promising results. Peers and social norms seem to play a key role in informing individual decision-making around savings.

Many questions remain in clarifying what works and what doesn't, and at what cost, in financial education research and practice. What distinguishes the financial education programs that do find measurable positive impacts on savings behaviors? Is it the content, length, pedagogy or delivery? How does impact vary based on who the recipient(s) are within a household? Not enough studies engage in multiple-treatment designs, where such questions can be answered without resorting to cross-study comparisons.

Other key questions include: How can we better utilize spillovers and the spread of information and knowledge through peer networks? How important are considerations such as familiarity, homophily and trust with respect to the provider of information? How can herding tendencies around social norms be used to nudge people towards better savings practices? How effective are product-specific information programs compared to general instructions on good savings practices? How can alternative delivery channels (mass media via television, or mobile phones) improve the cost-effectiveness of financial education?

Social Constraints

The alignment between the preferences of the various financial decision-makers in a household, often the male and female heads of household, and resulting strategic behavior, can significantly affect efficient allocations towards savings and consumption. Commitment savings products that restrict easy access to accumulated funds have been found to improve women's ability to save and purchase female-oriented durables, and their decision-making in the household. Transnational households face more acute challenges in joint decision-making and increasing the emigrant's control of remitted funds has been found to lead to improved savings. There is some evidence to suggest that individuals make inefficient choices on savings and investment allocations in order to prevent leakage to expectant social networks. At the same time, the use of formal savings does not seem to crowd out informal insurance.

Here too key questions remain: How are household savings decisions made as collective decisions? How do individuals within a household unit share savings norms and bargain over allocations, whether between spouses, siblings, parents and their children? How do new savings products alter the control of resources within a household? When and between whom is more control preferable, and when does less control lead to better savings outcomes? How does the use of formal savings instruments interact with and influence sharing norms and informal insurance through traditional social networks?

Behavioral Biases

Much remains to be done to understand to how to best meet behavioral consumers "where they are", cognitively speaking. Remarkably little is known about which behavioral biases actually drive savings behavior, and whether and how different biases interact with each other. This has potential implications for product design; e.g., we need to understand the extent to which soft commitment devices might be beneficial for consumers who are overly optimistic about their prospects for success, compared with harder commitment devices. Another example is the interaction between upfront information (or decision aids) more broadly and the use of a behavioral intervention like a commitment device or default option.

Another key line of inquiry on the behavioral side is exploring how to optimize a seductively simple behavioral innovation like "messaging" (e.g., reminders and/or feedback). Does "pro-saving" messaging actually increase net saving, or does the very psychology (e.g., limited attention) that allows messaging to

drive saving or investment behavior in a proximate sense lead people to unthinkingly finance their "saving" activity with expensive borrowing? Does messaging lose its effectiveness over time as people tune out or more third parties compete for attention, or does it gain effectiveness over time (or become superfluous) as people build habits? What exactly should messaging say; for example, should it be task-focused, progress-focused, and/or goal-focused? Are potential savers sophisticated about how to best remind or motivate themselves with ongoing communications, or can third-parties do better? Should messaging focus on lower- vs. high-frequency decisions? More broadly, more theory, evidence, and innovation is needed to derive the optimal balance of (or menu of options for) "auto-pilot" vs. "mindful" approaches to saving.

Simultaneous Saving and Borrowing: An Understudied Issue

Many microcredit providers now force, or encourage, their borrowers to simultaneously "save" (at APYs mostly below 5%) while borrowing (at APYs mostly above 36%). This practice only makes sense for the client if the long-run habit formation benefits outweighs the substantial short-term pecuniary costs of simultaneous saving and borrowing (as opposed to just borrowing less), and there is no other way to generate the long-run habit. This proposition can and should be tested, since it is potentially quite costly for the client, and deceptively so. It also seems worth testing whether habit formation can be molded (and mentally accounted for) in a way that is more advantageous to the client: is not making regular loan payments a "habit" that can be transferred to "paying oneself" (i.e., saving) once the loan is paid back?

Developing countries are also promising places to address key unanswered question on other prominent "pro-savings" interventions like default options, and kitchen-sink behavioral approaches like Save More Tomorrow: can these approaches be adapted "down-market"? Do they actually increase net saving and wealth accumulation over time (or do they simply induce substitution for other savings, or more debt)? Do they operate on distinct cognitive or behavioral pathways that yield insights for the development of products and other interventions more broadly?

In evaluating the success or failure of savings models—be they theory, policy, or practice—it is important to recognize that convincingly measuring success or failure can be difficult conceptually, and require substantial resources. Most prior work has fallen short of convincingly measuring net savings rates, long-term wealth accumulation, subjective (financial) well-being, or other outcomes that plausibly capture individual, household, or societal welfare. Innovations in data collection may be as important as more "conceptual" innovations going forward.

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