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Savings by and for the poor

A research review and agenda

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Abstract: The poor can and do save, but often use formal or informal instruments that have high risk, high cost, and limited functionality. This could lead to undersaving compared to a world without market or behavioural frictions. Undersaving can have 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 behavioural 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: poverty, randomized evaluation, savings

JEL classification: D12, D91, G21, O16

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Note: Table is at the end of the paper.

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1 Introduction

Savings mobilization is critical for individual and societal welfare. At the individual level, savings help households smooth consumption 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. Only 22 per cent of adults worldwide report having saved at a formal financial institution in the past 12 months, and 77 per cent of adults living on less than US\$2 a day report not having an account at a formal financial institution (Demirguc-Kunt and Klapper 2012). Mounting evidence also suggests that various demand-side constraints depress saving even among those with access. Social claimants, lack of knowledge, and/or behavioural biases may 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 to 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. These patterns do not square easily with classic poverty/liquidity trap explanations for persistent poverty.

Does removing barriers to saving produce tangible benefits? Microfinance institutions (MFIs) and many donors and policy makers are betting that the answer is yes, in a (double-)bottom-line sense. Microfinance institutions are often broadening their initial focus on microcredit to now include the provision of savings products.¹ MFIs have 72 million microsavings clients to date, 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 et al. 2006a, 2010; Brune et al. 2013; Dupas and Robinson 2013a, 2013b; Prina 2013). These studies show large positive impacts on various outcomes 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 (Banerjee 2013).

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. Policy makers 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 more-developed countries have found that people get their savings and consumption decisions about right over the life-cycle (Scholz et al. 2006), although debate continues to rage on this question (Poterba et al. 2013).

¹ This expansion in the focus of microfinance also includes offering insurance products, new payment channels, and educational interventions; see for example, Radcliffe and Voorhies (2012) for an overview of electronic payment channels for the poor, and Xu and Zia (2012) for a review of 'pro-savings' financial education and literacy training.

Despite widespread interest in, for example, ‘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. By ‘undersaving’ we mean a lower level of savings than one would have in a world with perfect markets (perfect information, zero transaction costs, and perfect competition amongst financial institutions) and fully attentive, fully rational, fully consistent, etc., decision-making. The five categories of frictions are as follows: transaction costs, lack of trust and regulatory barriers, information and knowledge gaps, social constraints, and behavioural biases. We review theory and evidence on each in Section 2. These categories are not meant to be exhaustive, or even mutually exclusive; rather they are meant to organize our thinking about what could go wrong in markets for savings vehicles, and about how to fix any inefficiencies or inequities that would motivate (policy) intervention.

We largely 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 more-developed countries. In certain cases we highlight studies from more-developed nations, when we think they offer novel insights into the design of interventions or directions for future research.

We focus our review on less-developed countries (LDCs) for several reasons. First, from a humanitarian perspective, the potential social impact from solving market problems is likely greater, given starker poverty and market imperfections (e.g., less competitive formal markets for savings products). Second, development economics has a deeper recent literature, using experimental methods to establish causality, on the relative effectiveness of different financial products.² This empirical focus on attribution often allows more precision in terms of testing theories of consumer behaviour. Our focus is on just that: using experiments to help test across theories of consumer choice and financial decision-making over time. This often results in the study being embedded inside what one may call a ‘product test’. The LDC focus also includes a broader range of inquiry; for instance, credit market frictions and social claimants, which are less likely to be relevant in the US and other more-developed countries. We emphasize, however, that we do not argue that LDC denizens are fundamentally more ‘behavioural’ than their counterparts in richer countries (although they may be more subject to scarcity impinging on decision-making along the lines of Shah et al. (2012) and Mani et al. (2013), as we discuss below).

Section 3 synthesizes a few key patterns from the body of evidence collected so far on savings constraints, and the impacts of relaxing them, in developing countries.

Section 4 discusses measurement and methodological issues involved in accurately estimating impacts of expanded access to and usage of savings products.

Section 5 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.

Throughout, our approach to applying research to policy development is principally one of ‘diagnose and treat’. We seek to develop evidence on what might be failing in markets for savings products—whether those failures are supply-side, demand-side, and/or policy-side—and to flesh out the implications of that evidence for future research and policy. We think this approach is more justifiable, on ethical grounds, than a paternalistic presumption that people should save more.

² This is changing (see e.g., <http://www.poverty-action.org/ushouseholdfinance>), but has been true historically for both cost and various institutional reasons.

It is also more likely to produce cost-effective solutions than a ‘ready, fire, aim!’ approach to pursuing policy objectives that makes strong (often implicit) assumptions about the causes of particular problems and the best ways to solve them. With this diagnose and treat approach in mind, we now dive into our five classes of constraints/potential failures.

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 policy maker 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 programmes 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 costs of opening and maintaining bank accounts has been shown to increase the take-up of formal savings accounts and, in some cases, savings balances. A key 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 market-vending micro-entrepreneurs (Dupas and Robinson 2013a). In this study of 250 self-employed individuals (market vendors and bicycle taxi drivers) in a market area in western Kenya, half were randomly selected for the offer of a bank savings account at a village bank. The research team paid the account opening fee of KES450 (US\$6.40) for each opened account and gave each client the minimum balance of KES100 (US\$1.43), which they were not allowed to withdraw from the account. Absent these subsidies the account had an effectively negative interest rate (due to fees charged on withdrawals).

Of the 156 treatment group individuals given the opportunity to open a savings account through this intervention, 47 per cent opened up the account and used it at least once, with 41 per cent of the entire treatment sample becoming ‘active’ users, i.e. making more than two deposits in the first six months (13 per cent declined to open an account, and another 40 per cent opened an account but never made a deposit). Among the market vendors, the treatment group increased average daily investment in their businesses by 38–56 per cent and daily private expenditures by 37 per cent relative to the comparison group, four to six months after the accounts were offered. The intervention did not have any significant impact on the bicycle taxi drivers. Given the small sample and the short timeframe involved in measuring impact in this study, it serves as an important

illustration of potential impacts but requires further scrutiny with improved statistical power. 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 with a larger sample and across varying contexts has important positive impacts on formal savings account take-up, usage, investment, expenditures, and welfare.

A similar field experiment in Nepal also finds strong results from eliminating the costs of opening formal savings accounts among a general sample of poor households (Prina 2013). From a sample of 1118 households in 19 slum settlements, 567 female household heads were randomly chosen to receive the option of opening basic savings accounts 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 NPR500 (US\$7)). The account offered a nominal interest rate of six per cent on balances, which was lower than the Nepalese inflation rate of over ten per cent. The offer of the bank accounts was made through a public lottery in the 19 communities. The remaining 551 women in the sample were not offered the free bank account and formed the comparison group.

Eighty-four per cent of the households offered an account opened one, and 80 per cent of the entire treatment sample used it frequently (making at least two deposits over a one-year period). Access to these free savings accounts allowed participant households to accumulate significantly more wealth, increasing monetary assets by 25 per cent and total assets by 12 per cent 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 spent 20 per cent more on education and 15 per cent more on meat and fish, than the comparison group. Households with school-age children spent 33-40 per cent more on educational expenditures (which includes spending on school fees, textbooks, school uniforms, and school supplies). The author also finds that for those households that had been hit by a health shock in the past month, those in the treatment group maintained a higher weekly income level compared to those in the comparison group who suffered larger reductions in weekly income due to the recent health shock.

The promising results on downstream impacts from the Dupas and Robinson (2013a) and Prina (2013) studies raise the question of why take-up and usage rates are not even higher, particularly when accounts are subsidized. An earlier field experiment with 564 unbanked households (both urban and rural) in Indonesia (Cole et al. 2011) finds that an increase in the subsidy offered to open a bank savings account from US\$3 to US\$14 significantly increases the share of unbanked households that open the account nearly three-fold, but from a low base: from 3.5 to 12.7 per cent.³

In an evaluation with a larger sample of 1565 unbanked individuals in Western Kenya, Dupas et al. (2012) provides vouchers for subsidized savings accounts to 55 per cent of the sample through random assignment. Take-up was 62 per cent in the group that was offered the savings account with the opening fee and minimum balance paid for by the research team. However, only 18 per cent of the group offered the subsidized account made two or more deposits within a year of opening the account. Schaner (2013a) offers large subsidies to married couples in Kenya and finds that only seven per cent of accounts were used in their third year post-opening.

The lack of usage could of course be due to heterogeneity in valuation (stemming from

³ 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 (Cole et al. 2011).

heterogeneity in impacts), or to heterogeneity in other constraints. For example, Dupas et al. (2012) finds that some respondents list risk of embezzlement, unreliable services, and high ongoing transaction fees as concerns with formal banking. Schaner (2013c) finds heterogeneous responses to reductions in transaction fees that may be driven by intra-household bargaining issues.

Other studies examine the impacts of varying marginal yields on savings balances. Karlan and Zinman (2013) is the only study we know of that experiments with a range of *market, unsubsidized* rates. A rural bank randomized rates and account ownership requirements (individual, joint, or choice) on offers of a new commitment savings product in the Philippines. The bank made offers to 9992 individuals with regular income streams but without an existing account with the bank. 23 per cent of individuals opened the account, and nine per cent used it (i.e., made at least one deposit in addition to the opening deposit) over the subsequent 20 months. The yield and ownership requirements did not have significant effects on savings behaviour, neither in the full sample nor in sub-groups that vary by wealth, prior savings behaviour, liquidity constraints, etc.⁴

The remaining studies on savings yields introduce *large, subsidized* variation. Several US-based studies find statistically significant but often price-inelastic responses to these subsidies.⁵ The one LDC-setting study in this vein (Schaner 2013c) compares a market rate, 0 per cent, to 4, 12, and 20 per cent annual rates of return on savings in a field experiment in Kenya. The incentives were only offered for a six-month period. This offer was only made to couples who said they were interested in opening bank accounts, and each couple was offered the option of opening up to three bank savings accounts (individual account for the husband, individual account for the wife, and a joint account). All participating households opened at least one account. The study finds that accounts with the 20 per cent interest rate had a significantly higher probability of usage (i.e., making at least one transaction in the account during the six months following treatment) of 8.6 percentage points (12.6 versus 4 per cent). In terms of price-elasticity, the study finds that a zero per cent interest rate has four per cent usage, a four per cent interest rate results in 5.5 per cent usage (not statistically significant), and a 12 per cent rate results in 8.9 per cent usage (a statistically significant increase).

The most striking finding in Schaner (2013a), and arguably in any of the ‘impacts’ studies, is that the highest subsidy produces dramatic long-term impacts on income. Despite the fact that all subsidies were short-term, respondents in the 20 per cent arm report US\$15 higher monthly income than the zero per cent comparison group, in the long-term. Thus two and a half years after the six-month subsidized interest rate intervention was withdrawn, participants in the highest-subsidy group report income that is 22 per cent higher than the comparison group, and orders of magnitude higher than the subsidy amount, which totaled less than US\$1 for 95 per cent of recipients. The author explores the mechanism underlying this result and infers that the high subsidy increased the salience of saving, leading to improved (mental) accounting and improved entrepreneurship that produced the higher income. The results of this study, while promising, do arise in a context where each household was offered multiple bank accounts, and we do not have any way of inferring how price-elasticity measurements would differ if each household only had

⁴ Kast et al. (2012) also find very small price elasticity with respect to a change in savings yield from 0.3 to 5 per cent. The sample frame in that study is current borrowers from a microlender, with loans at about 45 per cent APR (i.e. Annual Percentage Rate), the change in savings yield is strictly inframarginal. Thus, this is the elasticity of savings for those simultaneously borrowing and saving.

⁵ In the US, Duflo et al. (2006) compare a market rate of return with 20 per cent and 50 per cent matches in evaluating take-up and savings levels for Individual Retirement Arrangement accounts; Mills et al. (2008) and Grinstein-Weiss et al. (2012) compare a market rate to 100–200 per cent (1:1 or 2:1 matches) in Individual Development Accounts; Beshears et al. (2010b) looks at the effect of removing employee contribution matching, and instead introduce a fixed-employer contribution level for automatic enrolment savings plans.

the opportunity to open a single account. Future research that tests whether the long-run result replicates, and that further unpacks the mechanism(s) driving the results, is critical.

Another fruitful line of inquiry for future work is mapping demand curves for savings and savings products. We suspect that price sensitivity to savings yields is likely to contain the sorts of non-linearities found by Chetty (2012) with respect to tax rates and labor supply: at low yields and/or low balances, the dollar implications of yield variation is too miniscule to merit attention, but at some point on the demand curve the stakes become big enough, and price sensitivity kicks in.

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 can be 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), in ‘on-ramping’ (facilitating the administrative process of opening an account), and in introducing new products and technologies that change the way people access and interact with banks.

Randomizing bank branch expansion to estimate impact on savings take-up and welfare impact can be difficult or unfeasible in many areas. Two non-experimental approaches are noteworthy, one better identified (India) than the other (Mexico). In India, Burgess and Pande (2005) studies an exogenous expansion of bank branches between 1977-90 from a change in regulation that led to an increase in both credit and savings delivery to underserved areas, and identifies measurable macroeconomic impacts on poverty reduction from the expansion of financial services (both credit and savings). Aportela (1999), in Mexico, finds that an expansion of a government postal savings bank leads to lower levels of poverty.

Due to the difficulty of large-scale randomized studies on full banking services, 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 effects of bringing banks closer to geographically secluded populations, through the introduction of a fully-equipped mobile van ‘bank on wheels’, which also included an information campaign randomized at the community level to increase formal savings. A two-year panel dataset containing 2006 households was collected in the pre-harvest season. Take-up rates for bank accounts were still low despite the intervention, increasing from 9.3 per cent to 12.4 per cent across all treated areas (33 per cent increase), and from 8.6 per cent to 12.3 per cent (43 per cent increase) in treated areas that were three or more kilometers away from the ‘bank-on-wheels’ stop. No downstream impacts on the ‘new savers’ were measured in this panel survey.

In the Philippines, Ashraf et al. (2006b) studies the randomized offer of a deposit collection service to micro-savers of a rural bank. The product had a cost of four pesos (about ten cents US) per visit, which could be monthly or bi-weekly. The service had a take-up rate of 28 per cent among those clients who were reached by the marketing team and offered the service, and 14.2 per cent of the full treatment sample regularly used the service (i.e., half of those who opened the account). Interestingly, while present-bias 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 discounting as a significant correlate of take-up. Distance, however, was a very strong correlate: the probability of take-up was six percentage points higher for each additional ten kilometers between the client’s home and a bank branch. For the entire sample, being in a

neighbourhood where the deposit collector service was offered implied an increase of up to 40 per cent in savings stock compared to clients in comparison neighbourhoods.⁶

Schaner (2013c) in Kenya also finds significant increases in savings transactions from expanded geographic access, via cards that access an ATM network, though in this case it is unclear whether pecuniary or non-pecuniary cost reductions drive the result because the ATM cards reduced marginal transaction fees substantially as well. Future work that simultaneously and independently randomizes pecuniary and non-pecuniary costs would be very informative.

2.2 Lack of trust and regulatory barriers

Trust also may explain some shortfalls in the relationship between savers and formal financial institutions. Trust affects the willingness of individuals to use a particular financial institution based on their subjective assessment of its reliability. Regulatory barriers, often defended as enhancing overall trust in an institution, frequently include requirements such as ‘know your customer’ rules, which can hinder participation in the banking system for the poor. Trust thus affects relationships between regulators and financial institutions as well.

2.2.1 *Low consumer trust and confidence*

In any economic transaction, one party’s lack of trust in the other acts as an implicit cost due to moral hazard and either increases monitoring and enforcement costs, or leads to unconsummated transactions.

Guiso et al. (2004) measures how trust and the development of financial markets are related in Italy using a large panel survey, and finds that low social-capital provinces use fewer checks and hold more cash. Similarly, Coupé (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 10-15 percentage points more likely to keep all their savings in cash.

Dupas et al. (2012) in western Kenya, with a sample of 1565 unbanked individuals, finds reasonable take-up (62 per cent) but lower active usage (18 per cent) of free savings accounts. A qualitative survey on a subset of study participants, finds that low trust in the bank is often cited as a key concern that deters people in their sample from using formal bank accounts. As many as 15-37 per cent 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 per cent mentioned risk of embezzlement by the given bank as a concern. In contrast, Djankov et al. (2008) reports on a survey of 4765 Mexican banked and unbanked households, of whom 2182 households did not have a bank account. When asked to pick their main reason for not having a bank account from a list of options, only two per cent of the unbanked sample mentioned not having confidence in the institution as opposed to 89 per cent who stated they did not have enough money and six per cent who said that they did not want an account.

There is a sizeable behavioural economics literature that varies trust experimentally in lab settings, in order to, for example, evaluate the impact of trust on risk-taking (see Karlan 2005; Schechter 2007). But to our knowledge, there are no randomized field evaluations that directly tackle the

⁶ Preliminary results from an ongoing study by McConnell (2012) with 1,601 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 more likely to open an account when they can open the account directly at their place of business, pointing to the importance of convenience as a deciding factor in financial decisions.

issue of low trust in formal banking services as a barrier to saving. The challenge, from an experimental perspective, is clear: one cannot easily randomly assign trust. One could, for example, randomize the marketing of a bank, in which some advertisements focus on why the bank should be trusted. We are unaware of studies that have done this directly.

While many factors can be expected to affect consumer trust in a financial institution—reputation, brand, product quality, price, etc.—governments are thought to play a central role in building and maintaining client trust in all formal financial institutions and in facilitating contractual exchanges between strangers who are not bound by pre-existing social ties or reciprocal norms (La Porta et al. 2002). Through prudential regulation, central banks aim to assure investors that a country’s retail banks and other regulated financial institutions will honour their deposits. Such 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).

Banking institutions fall into two main regulatory categories: those granted full banking licenses, i.e. allowed to accept deposits from clients and on-lend funds, and those with a non-banking financial institution license (often covering most microfinance institutions) that allows them to lend to clients, but restricts them from accepting deposits and/or from on-lending funds. The former are always regulated by the central bank, while the latter institutions are sometimes overseen by a separate regulator and subject to less oversight given their limited scope. Small banks may also escape some regulatory scrutiny, given lack of systemic importance, and the difficulties of monitoring compliance forensically with data (Christen and Rosenberg 2000; Conroy 2000).

There appears to be a general tension between prudential regulation and access/outreach objectives: the bigger institutions are easier to regulate with limited resources, but limiting the ability of smaller institutions to offer saving products presumably forgoes some access and innovation. The recent policy discourse on ‘proportional’ regulation might offer a way out, but that notion is still very vague and needs to find actionable guidelines. This is clearly an area that deserves more systematic inquiry and experimentation to identify the most promising ways to improve consumer confidence and trust in the formal banking system.

2.2.2 Regulatory barriers

Casual empiricism suggests that strict regulation in monitoring bank account ownership and transactions serves as a key barrier to entry for the poor. Accountability on flows of even small denominations of value has become all the more salient since restrictive Anti-Money Laundering (AML) laws have been put in place to detect movements of money that might be related to terrorist activities (FATF 2013).

Such prudential regulation imposes additional transaction costs for banks and customers. One impediment to the expansion of small-balance savings accounts that has been identified in a few settings is the due diligence requirement on these accounts (Ivatury and Mas 2008; Jentzsch 2009). 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, all of which dissuade small savers—particularly poor individuals with few formal documents—from getting an account.

KYC rules present several potential barriers to savings mobilization. The identification document requirement can be a big hurdle in countries that lack comprehensive identity registries.⁷ Waiting periods (often 24-48 hours) needed to process KYC requirements in some countries can serve as an entry barrier in their own right, and may also lead to account activation at times when clients are not in the presence of a banking agent (who could, for instance, give them a basic tutorial on account usage). Banking models that use third-party correspondent agents have highlighted the need for new methods to screen clients that are low-cost, standardized, and compliant with regulation (Bankable Frontiers 2009; CGAP 2010; Jentzsch 2009). Typically, these new systems try to use some form of biometric identification to fulfill KYC rules (fingerprints or iris scans).⁸ There has not yet been a rigorous evaluation on the impact of these changes on savings account take-up, outreach, and/or bank risk exposure.

In the one field experiment conducted on KYC issues, Chin et al. (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 five-month period following the intervention. They also find that those in the treatment group saved nine percentage points more and decreased their remittances to Mexico as a share of income by six percentage points relative to those in the comparison group. 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, which we discuss in section 2.4.1. Future research would do well to test whether these results replicate, and if so how much of the effects are driven by KYC requirements vs. price.

2.3 Information and knowledge gaps

Lack of information—e.g., low ‘financial literacy’—is often cited as a (potential) cause of undersaving. Policy and programmatic efforts that attempt to increase financial literacy in order to increase saving are built on three key assumptions, which we consider in turn: (1) knowledge is low (evidence says yes); (2) low knowledge causes undersaving (evidence says maybe); and (3) interventions can increase knowledge, cost-effectively (evidence says no, not with what is currently being tried). We will discuss each of these in turn, but we also lead the reader to Fernandes et al. (2013) for a more thorough meta-analysis of 168 papers, which concludes that financial education as typically implemented does not lead to substantial behaviour change.

Is basic financial knowledge low? Mounting evidence suggests ‘yes’. Recent surveys find that a significant share of the population in both developed and developing countries lacks basic financial knowledge.⁹ In India for instance, 26 per cent of respondents provided no correct answers to four

⁷ UNICEF statistics indicate that ‘the ratio of children (below the age of five) who are not registered ranges from ten per cent of all births in Latin America to 59 per cent in South Asia, and a stunning 66 per cent in sub-Saharan Africa’ (Jentzsch 2009).

⁸ KYC problems that apply to credit markets have a more direct benefit in reducing moral hazard—see (Giné et al. 2012) for the impact of introducing fingerprint identification on loan repayments and defaults in Malawi.

⁹ In a 2009 study in the US, less than half (44 per cent 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 per cent 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).

questions on basic financial principles in a recent survey, and only three per cent answered all four questions correctly (Cole et al. 2011). The same instrument tested in other LDCs finds similar low levels of basic financial literacy (see Xu and Zia 2012).¹⁰

Does low knowledge cause undersaving? Theoretically/conceptually speaking, the link is tenuous and nuanced. In many economic models competition, learning, delegation, and/or mean-zero errors will attenuate or eliminate any effect of low knowledge on undersaving. The point about mean-zero errors is particularly important, subtle, and often overlooked in discussions about the role of financial literacy. Even if competition, learning, and delegation fail, we still need to be clear about how low knowledge could produce *undersaving*, as opposed to *oversaving*, or to multiple errors that cancel each other out and produce optimal saving on average (at least at the aggregate level, but perhaps at the individual level as well if the lack of knowledge leads me to oversave sometimes and undersave at other times). There are several ways in which low financial literacy could be *associated* with undersaving. One is truly just an association, not causation: low literacy may be correlated with psychological/cognitive biases that actually drive undersaving (we consider such ‘behavioural’ biases in Section 2.5). Other mechanisms could actually be causal. There may be ‘low-knowledge traps’ where the uninformed rely on social learning and end up herding on sub-optimal choices (Banerjee 1992). When savings returns are risky (including risk of fraud), low-knowledge people may opt-out of the market (Calvet et al. 2007).

Empirically speaking, the causal link between low knowledge and undersaving looks increasingly weak, despite evidence from household surveys in more-developed countries of strong *correlations* (Hastings et al. 2012). However, a high correlation between financial illiteracy and low savings does not necessarily imply causality; e.g., mounting evidence suggests that financial literacy is correlated with important variables that are often omitted due to data constraints (Fernandes et al. 2013).¹¹ Reverse causality is also a concern, where saving increases knowledge rather than the other way around.

Say we grant that financial literacy is important, despite the lack of convincing evidence that literacy per se affects downstream behaviours like saving. Which interventions increase literacy (and saving)? And are the interventions cost-effective? The evidence on these questions is not very encouraging.

Interventions designed to improve financial literacy are typically programmatic. They range in duration from an hour or less, to several weeks. They are delivered in settings ranging from bank branches to classrooms. Most are group-based. We distinguish literacy programmes from programmes or services that offer advice, because we think there is a meaningful distinction between *teaching* someone how manage their finances—primarily by imparting facts and concepts, as literacy programmes seek to do—and *telling* someone how to manage their finances (as advice/counseling services tend to do). We also distinguish between programmes that focus on personal/household finances, and those that focus on microenterprises. We focus on the former, but draw some selected insights from the latter.¹² We focus on studies from developing country

¹⁰ The validity of different instruments that try to measure financial literacy needs to be debated and questioned. The set of four questions used in Cole et al (2011) and elsewhere (drawn from Lusardi and Mitchell (2006) to measure understanding of compound interest, inflation, and risk diversification, is helpful in as far as it draws our attention to the substantial share of people answering these simple questions incorrectly.

¹¹ For example, Cole et al. (2012) finds 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 inferred by Bernheim et al. (2001).

¹² For evaluations of entrepreneurship training programmes, please see Karlan and Valdivia (2011) on Peru; Giné and Mansuri (2011) on Pakistan; Bruhn and Zia (2011) on Bosnia and Herzegovina; Fairlie et al. (2013) on the US; Bruhn

settings, and note that the Fernandes et al. (2013) meta-analysis of financial literacy interventions, which includes studies from both developing countries (DCs) and less-developed countries (LDCs), concludes that interventions have small if any effects and are unlikely to pass a cost-benefit test.

In an early comparison of price vs. information as a barrier to saving in Indonesia, Cole et al. (2011) offers a free two-hour financial education programme on the workings and benefits of bank accounts. The study reports that 77 per cent of individuals agreed to participate in the experiment. However, the intervention 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 or low levels of education. The study does not measure intermediate knowledge outcomes. In contrast, modest financial subsidies have much larger effects, inducing a nearly three-fold increase in take-up.

In a subsequent study, Carpena et al. (2011) uses a randomized experiment to measure the effect of financial training in western India on three distinct dimensions of financial knowledge: numeracy skills, basic financial awareness, and attitudes toward financial decisions. Among 1200 urban households in Ahmedabad, two-thirds were randomly assigned to a video-based *financial education* programme offered at a training center once a week (two-three hours per session) for five weeks, the remaining third served as a comparison group and received a video-based *health training* programme delivered in the same manner, and all households received a test a few weeks later. To enhance motivation for learning, the researchers added a pay-for-performance treatment. Attendance figures at the sessions are not reported in the paper. The study finds that financial education has limited effects in increasing financial numeracy even in the cases where individuals were provided with monetary incentives. On the other hand, financial education did influence participants' awareness and attitudes toward 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. Subsequent bank account take-up and usage were not measured in this study.

In another study in western India, Field et al. (2010) finds that giving financial literacy training to women working in the informal sector has no impact on their probability of saving. The programme involved running two-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. The study reports that more than 70 per cent of those invited attended the training. 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 study did not measure intermediate knowledge outcomes.

Seshan and Yang (2013) 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 232 married, male Indian migrant workers based in Doha, Qatar, of whom 157 were randomly offered a short financial literacy training (a three-hour workshop followed by a two-hour dinner) focused on creating and executing household savings plans. The other 75 workers were not offered the training. Of those invited, 47.6 per cent attended the training. The study does not measure knowledge outcomes, but finds indications of behaviour change, with migrants who received an invitation being 48.4 per cent more likely to self-report

et al. (2012) on a consulting programme in Mexico; and Drexler et al. (2013) on a simplified heuristics-based programme in the Dominican Republic.

jointly making financial decisions with their wives. Impacts are heterogeneous by baseline savings levels (strong effects for those with low savings levels at baseline).

Despite the mixed (at best) impacts of financial literacy programmes on literacy and downstream behaviours, and truly scant evidence on whether such interventions change (much less *improve*) savings decisions, we nevertheless draw several glimmers of hope/insight for rethinking approaches going forward. First, it has been difficult thus far to disentangle the (in)effectiveness of the treatments themselves from the often low take-up of the treatments (many studies so far offer explicit incentives or compensation—cash payments, dinner, etc.—to boost participation rates). Behavioural biases could lead consumers to undervalue financial education, so going forward estimating treatment-on-the-treated effects and determinants of take-up decisions would be fruitful. Second, several of the existing studies find heterogeneous effects, suggesting the importance of targeting to match content with recipients. Third, and closely related, there has been relatively little focus thus far on youth, and we know of at least three in-progress evaluations of class-based financial education programmes for children and youth with promising preliminary results.¹³ Fourth, it may be the case that *less is more* when it comes to imparting knowledge, at least to adults. Two of the more promising sets of results—Drexler et al. (2013) and Seshan and Yang (2013)—come from programmes that are either very simple (in terms of content) or short (in terms of total time commitment) and focused tightly on particular behaviours. Fifth, and closely related, we share Fernandes et al.'s (2013) view that ‘just in time’ information interventions (e.g., those that are linked to financial product take-up or other ‘teachable moments’) remain promising; see, for example, Song's (2013)'s study described in Section 2.5.3. Sixth, and again closely related, we emphasize that informational interventions need not be programmatic, particularly if it turns out to be true that the timing, specificity, and framing of content are more important than its comprehensiveness.

Two US studies suggest that social learning can have a strong effect on savings behaviour (Beshears et al. 2012; Duflo and Saez 2003), and we suspect that literature on social networks are generating insights on how to best harness such effects. Similarly, Berg and Zia (2013) randomly offer middle- and low-income viewers in South Africa monetary incentives to watch one of two soap operas airing on overlapping time slots, one of which embeds exemplars of responsible and irresponsible financial behaviours while the other does not modify content along these lines. While the study finds no effect on general financial literacy, the treatment group scored 4.5 percentage points higher on average on questions related to financial issues that were specifically addressed in the soap opera. Those in the group encouraged to watch the soap opera with the ‘exemplar’ financial behaviours content were 69 per cent more likely to borrow primarily from formal institutions. They were also less likely to have recently financed a durable using expensive credit (by 23 per cent) and less likely to have gambled (by 17 per cent). There are also many efforts underway to ‘game-ify’ the delivery of basic financial concepts, although we are unaware of any evaluations with citable results as of yet. Finally, interest in the more traditional approaches to social marketing and point-of-sale disclosure remains strong, although evidence on their effectiveness is limited.

2.4 Social constraints

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.

¹³ For details on these recent evaluations of child and youth financial literacy interventions, see ‘Starting a Lifetime of Saving: Teaching the Practice of Saving to Ugandan Youth’ (study description at <http://poverty-action.org/project/0113>); ‘Evaluating the Efficacy of School Based Financial Education Programs’ in Ghana (study description at <http://poverty-action.org/project/0465>); and ‘Financial Literacy and Behavior Formation: Large Scale Experimental Evidence from Brazil’ (Bruhn et al. 2013).

These links are often informal, in that they are neither regulated nor enforced by any third-party institution. However, social ties and norms can foster risk-sharing within and across households.

Social links and obligations 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 and a lack of ability to commit to consumption/savings plans (the lack of commitment is a contracting friction/failure that prevents intra-household bargaining from producing efficient outcomes). 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.

2.4.1 Intra-household bargaining and sharing

Variations in the preferences of the male and female heads of a household can have large effects on savings and investment behaviours, with important implications for savings product design. Furthermore, if the woman lacks relative power in the household, she may not have agency over her own decisions, and this may also have ramifications for savings that could benefit the children (if the women have child-centered preferences, more so than the men). In an early non-experimental study in Kenya, Anderson and Baland (2002) finds that the probability of participation in a Rotating Saving and Credit Association (ROSCA) follows an inverted-U relationship with a woman's bargaining position within the household (where bargaining power is proxied by income share). This reinforces earlier hypotheses that the observed widespread participation in informal savings clubs is in part a response to intra-household bargaining difficulties (Besley et al. 1993). Hertzberg (2012) also presents some recent and related theory.

We know of three papers that directly tackle the empirical question of how intra-household preference heterogeneity affects household savings rates and investment behaviour. Among 142 couples in Kenya, Robinson (2012) randomly gives either a husband or wife a small positive, public, income shock once a week for eight weeks; i.e., the husband and wife each had a 50 per cent chance of being chosen each week. Husbands increase their expenditures on privately consumed goods in the weeks after they receive a positive income shock, but not in weeks when their wives receive the additional income. In contrast, there is no significant increase in the expenditures of women when they or their husbands receive the shock, suggesting that women save all of the additional income. In a separate experiment with married couples in Kenya, Schaner (2013b) finds that household saving is increasing in how associatively-matched couples are on their individual discount rates. Specifically, well-matched couples are more likely to use experimentally offered and subsidized joint accounts, and they respond much more to variation in rates of return. Ashraf (2009), in another lab experiment in the field in the Philippines, randomizes the allotment of a sum of money equivalent to a day's wage to existing or previous clients of a bank, either in public or in private. The study finds men and women whose spouses make the savings decision in the household to be more likely to deposit the money into their own account in the private condition, and commit it to consumption in the public condition.

Several other experiments find evidence that intra-household preference heterogeneity produces demand for commitment. In another arm of her study, Schaner (2013c) finds that responses to reductions in transaction cost vary substantially with the gender of the account-holder. Reducing transaction costs by half (through the offer of ATM cards) significantly improves long-run account usage by 62 per cent (the intervention produces a 45 per cent increase in the number of deposits and a doubling of the number of withdrawals in the first six months). This positive impact is, however, concentrated in individual accounts held by men and in accounts jointly held by men and women, with an insignificant, negative-signed effect on accounts individually held by women. Additional findings suggest that bargaining power asymmetry is a key mechanism.

Ashraf et al. (2010)'s follow up on the long-run effects of offering a commitment savings account (SEED, i.e. Save, Earn, Enjoy Deposits) in the Philippines finds that the women offered the account increased their scores on an index of household decision-making by 0.14 standard deviations over the comparison group. Heterogeneous impacts by bargaining power were important, with a significant increase in female-oriented durable goods purchased in households where the women had below-median decision-making power at baseline (by PHP1,457).

Bargaining over financial decisions can be magnified in migrant households, where decision makers face higher costs of sharing information. Ashraf et al. (2011) varies the degree of control over remittances by an 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, with random assignment to individual and/or joint accounts in the home country. Over a six-month period, the study finds higher take-up (by 21.7 percentage points) and higher savings in the project accounts (by US\$211) among emigrants given the greatest control over remitted funds. After a year, total savings among households in which the remitter expressed demand for control at baseline increased by US\$2024 or 216 per cent among those in the group offered the joint account and the individual account for the remitter, vs. the comparison group that was not offered any account (US\$2,962 vs. US\$938 in total savings, respectively).

Chin et al. (2011) finds very similar results for Mexican emigrants in the US from the randomized allotment of ID cards to Hispanic individuals living in the US, which is a requirement to open a formal savings account. Participants self-reported at baseline on their level of control over the spending of their remittances in Mexico. The intervention improved migrants' likelihood of opening a bank account in the US by 38 percentage points, increased their US savings as a share of income by nine percentage points, and decreased their remittances to Mexico as a share of income by six percentage points. Impacts were largest for those reporting no control over the use of the remittances in Mexico at baseline.¹⁴

2.4.2 *Inter-household bargaining and sharing*

Family and community networks are important sources of risk-sharing in developing (and other) countries (see Robinson (2012) for a review). The implications of these networks for savings behaviour and optimal savings rates are complex; e.g., well-functioning risk-sharing reduces the need for precautionary saving.

We are particularly interested in questions of whether and how savings behaviour responds to social claimants (Platteau 2000). There is ample descriptive evidence—much of it from anthropology, but increasingly from economics as well, as discussed below—that wealthier households are indeed pressured to support less-well-to-do people in their networks. But the links from this pressure to saving behaviour are not well-established. Do claimants act as a tax on household savings and wealth accumulation? Do commitment devices and concealment mute the depressive effects of any tax, and at what cost?

In a non-experimental survey of credit co-operatives in Cameroon, Baland et al. (2011) finds that 19.1 per cent of all members take out loans that are fully collateralized by liquid savings held in the

¹⁴ In a lab experiment in the field in Mozambique, Batista et al. (2013) find that when randomly offered the option of making cash or in-kind gifts to close peers (outside the family) in a repeated dictator game, the choice of making in-kind gifts accounted for 42.6 per cent of all giving and increased total giving by 5.5 percentage points. The demand for 'other-control' seems to exist even inter-household.

same financial institutions, and end up paying a penalty that is equivalent to a 24 per cent interest rate due to this simultaneous saving and borrowing behaviour. Ethnographic work with the clients who over-borrow suggests that clients use credit as a way of sending a message to their social networks that they are too poor to have available savings.

Three lab experiments in the field test varying aspects of this constraint. Jakiela and Ozier (2012) randomize the provision of gifts of different sizes that can be invested at varying rates of return, either in public or private, in western Kenya. The study finds that women who receive the large endowment are 9.6 percentage points more likely to invest an amount no larger than the small endowment when returns are observable, corresponding to a 5.4 percentage point decrease in investment level. No similar trend is observed among male participants. Women who had relatives participating in the game and observing their returns were especially prone to staying away from making profitable investments. Giné et al. (2013) tests how individuals within a household revise their intertemporal plans over time in Malawi. 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. Shortly before the payout, some households are then allowed an unanticipated revision in their allocations. The study finds that increased initial allocations toward 'later' periods are positively correlated with baseline wealth and the number of relatives in the village. However, revisions in allocations toward the present are not associated with spousal preferences for such revision, but instead relate most strongly to tendencies towards present-biased preferences. Chandrasekhar et al. (2013) conducts a randomized lab experiment in the field with villagers from rural Karnataka in south India that has participants playing variants of a consumption smoothing game with members of their social network. The study reports that access to savings allows individuals to smooth some of the income risk they face 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 less so when they are socially close.

In their study on reducing the cost of accessing a simple formal savings account in Kenya, Dupas and Robinson (2013a) note that the accounts led to significant increases in microenterprise investment and expenditures, despite no interest being offered on the savings balances and despite withdrawal fees being charged to take money out. They are unable to identify any mechanism, but discuss the possibility of social pressure, risk-aversion and/or time-inconsistency driving this result.¹⁵ However, the experiment in Brune et al. (2013) produces little evidence to support the importance of 'other-control' (as opposed to 'self-control') motives and account features. Specifically, their commitment treatment did not in fact lead to lower reported transfers to other households relative to the comparison group, or to the ordinary savings account group. Nor did a sub-experiment that publicly revealed savings balances affect behaviour. We discuss this paper further in Section 2.5.1.

In all, there is mounting evidence from many different settings that social claimants induce individuals to engage in strategic behaviour—including commitment, concealment, and saving less. But this evidence is more suggestive and descriptive than definitive. Most of the evidence comes from surveys and lab-like settings rather than real-world choices. And much of the evidence is consistent with other interpretations. Disentangling social- vs. self-control motives for saving behaviour, and fleshing out their implications for savings rates and product design, will be particularly important going forward.

¹⁵ They also note that usage has a strong positive correlation with wealth levels in their sample (Dupas and Robinson 2013a).

2.5 Behavioural biases

The behavioural social sciences suggest several cognitive tendencies that can lead to undersaving or more broadly to ‘present-bias’. Behavioural research has documented biases in preferences (costly self-control, loss aversion, anticipatory utility); in expectations/perceptions of prospects (e.g., over-optimism); in price perceptions (e.g., exponential growth bias); and in whether and how to make a decision conditional on all other variables (e.g., limited attention, planning fallacies). Understanding these biases can help us identify more and less malleable drivers of undersaving, and design products and processes that help people save as they aspire to in their more reflective moments. Our review below focuses on field (not lab) evidence linking specific behavioural biases to savings behaviour in developing countries; see DellaVigna (2009) for a broader review, and Zinman (forthcoming) for a complementary review of behavioural theories and evidence related to over-borrowing.

2.5.1 *Bias in preferences*

2.5.1a *Living for today: sources and implications of costly self-control*

Causal empiricism suggests that people struggle with self-control in many domains. Over-eating, over-snoozing, under-saving, etc. have all been attributed to a human tendency to ‘live for today’. Then when tomorrow arrives it is today again! Economists often formalized this *carpe diem* tendency in ‘multiple-self’ frameworks, where the ‘present-self’ may use the snooze button intensely while assuming that future selves will spring out of bed with the initial alarm (Laibson 1997; O’Donoghue and Levy 1999; Fudenberg and Levine 2006).¹⁶ In the savings context, this dynamic can manifest as procrastinating behaviour change (I will cut back a bit and start saving—tomorrow), and/or as consumption splurges (succumbing to temptation to consume today, perhaps by borrowing). Models of costly self-control also tend to deliver the key prediction that individuals will value *commitment*; that is people will choose, and even pay, to restrict their future choices in some way, to help discourage their future selves from over-consuming. We now review empirical evidence on these key predictions, starting with commitment.

(Self-)commitment devices

Individuals who are (partly) sophisticated about their *carpe diem* tendencies may want to constrain the actions of future selves. The intuition is that while today’s self wants to live for today, she is relatively indifferent between consumption in any future period; that is, today’s self may be very impatient when it comes to tradeoffs between today and tomorrow, but very patient when it comes to tradeoffs between tomorrow and any future period. So today’s self may want to make a plan to smooth consumption in the future—perhaps by saving for bad shocks, or for retirement. And if today’s self recognizes that future selves will want to deviate from this plan, today’s self may want to make a *commitment* that makes deviating costly (e.g., that makes a future self pay a penalty in that self’s ‘today’). This demand for commitment is absent in standard/neoclassical models of intertemporal consumer choice, where preferences/discounting are time-consistent, and hence I make plans and stick to them, unless something in my choice set changes that leads me to re-optimize my plan. In standard models, flexibility and choices are always good when it comes to managing my own decision making subject to constraints. I might still however make binding commitments to influence the behaviour of *others* (see Section 2.4).

¹⁶ Other models focus more directly on temptation (Gul and Pesendorfer 2004; Banerjee and Mullainathan 2010)—i.e., on the possibility that people get disutility from having the option to consume certain goods—and deliver similar predictions on consumption dynamics and antidotes to over-consumption.

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 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 labelled ‘School Fees’ where the depositor incurs a psychological cost of guilt or loss when withdrawing funds for non-education expenses (see Shefrin and Thaler (1988, 1992) on the application of mental accounting models to saving and consumption decisions). Default settings may also serve as soft commitments for future choices using the power of inertia.

The first field experiment on a hard commitment device to enable improved saving, in a developing country setting, concerned a savings account developed and tested by Ashraf et al. (2006a) in collaboration with Green Bank in the Philippines. The bank created a savings product called SEED 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 or neither 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 per cent of individuals opening an account. After one year, individuals offered accounts increased savings balances by roughly PHP411 or 82 per cent, relative to the comparison group. Among the subgroup of individuals who actually opened the account, savings balances were estimated to have increased by roughly four times this amount, with clients increasing their savings by over 300 per cent 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 per cent increase, which was no longer statistically significant (Ashraf et al. 2010). However, this can be interpreted either as a lowered savings rate, or as the savings having been withdrawn and converted into a lump-sum 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 behaviour 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 behaviour was deemed not optimal by the clients and they reverted after proper analysis.

In a test of access to savings accounts that included an assessment of self-control bias vs. ‘other-control’ problems in goal-attainment and investment, Brune et al. (2013) randomizes access to ordinary and commitment savings products among 3,150 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. Those who opened a savings account had the proceeds from their tobacco sales deposited directly (electronically) into their ordinary savings account. For those opening commitment accounts, funds would be deposited into their ordinary

account until the ‘trigger’ level chosen by them was reached, after which funds would be deposited into the commitment account until its pre-set target level was reached (all targets set by the individual). 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 the savings balance in their accounts, and their outcomes were measured against a subset of farmers that received the savings accounts but no raffle tickets that revealed this information.

Take-up of the offer of a commitment account along with an ordinary account was 20.7 per cent, compared to an 18.1 per cent take-up rate for just the ordinary savings account. 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 MWK16,513 and MWK18,801 in the ordinary and commitment treatment arms, respectively). However, the impact on agricultural investment, crop output, and household spending 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 7.7 per cent increase in land under cultivation, a 17.1 per cent increase in agricultural input use during planting, a 20.1 per cent increase in crop output at harvest, and a 13.5 per cent increase in household expenditures in the months just after the harvest versus the comparison group that received no account. While no significant increase in these outcomes was measured for the ordinary savings account group, the authors are unable to reject that the effects of the two accounts are equal. The study would need to be replicated with a larger sample and more statistical power to distinguish the differential impacts of ordinary vs. commitment savings accounts.

What is intriguing in this study is that 91 per cent of the savings deposited by those offered a commitment savings account (that led to the large impacts) were in fact kept in the ordinary accounts held by these individuals. Money is withdrawn relatively quickly after it is deposited into the ordinary savings account. The amount actually maintained in the commitment savings account that had the withdrawal restriction until the target date was reached was in fact very small. This points to a few alternative possibilities on the mechanism behind the impact of the commitment savings account, but none that the data in the current study can support. We see that the commitment mechanism is certainly not working through the ‘tying of one’s hands’ to resist self-control bias. An alternative explanation involves a signaling explanation for this behaviour, where the commitment savings account allows people the ability to better resist social network demands for their savings. However, this is not supported by the fact that the commitment treatment did not in fact see lower reported transfers to other households.¹⁷

Other explanations include the possibility that the cost of the commitment on the account with this feature was very low, which effectively made it simply a second regular savings account that might have triggered more ‘mental accounting’ mechanisms driving the differential impact. The authors themselves recognize that clients had to travel long distances (20 kilometers on average) to the bank branch and endure a median wait time of an hour to withdraw money from their ordinary accounts, imposing high transaction costs that might have led to the ‘withdraw soon after the deposit is made’ behaviour. Finally, the electronic direct deposit of tobacco sales proceeds only applied to those who opened an individual savings account, which combines the effect of the bank account as a new savings location but also as a new payment channel, in contrast to the comparison group that only transacted in cash. Despite the promising evidence of increased crop output and

¹⁷ The sub-experiment that involved the public revelation of savings balances did not lead to lower savings, which would be the case 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 inaccessible (though this was ineffective in part due to the low balances maintained in the commitment accounts).

post-harvest household spending results, therefore, this study raises numerous questions for further dissection.

Dupas and Robinson (2013b) is the first field experiment that tests the effects of different varieties of commitment savings options on behaviour, randomizing members of existing ROSCAs in Kenya to one of five groups. Two treatment groups were offered a lockbox for saving at home (that was earmarked for *preventative* healthcare expenses).¹⁸ Individuals in the *Safe Box* group were given the key along with the box. Individuals in the *Lock Box* group were not given the key, and had to call the programme officer to open the box. In a third treatment group, individuals were encouraged to save in an individual *Health Savings Account* that would be held at the ROSCA and earmarked for *emergency* health expenditures 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 *preventative* health expenses. The *Health Pot* thus tries to harness social pressure as a commitment device, in addition to earmarking.¹⁹ There is also a fifth comparison group.

To us, the comparison between the *Safe Box* and *Lock Box* treatments is particularly interesting, because this is the only test we know of between a softer vs. harder commitment in the same sample and for the same savings goal.²⁰ Harder commitments may provide more self-control, but at a cost of reduced flexibility for dealing with bad shocks, and less leeway for those whose behavioural biases may also impede their ability to set optimal commitments. The study finds a 74 per cent take-up rate (defined as a non-zero amount in the given box/account) of the *Safe Box* after the first six months and a 65 per cent take-up of the *Lock Box* over the same period. Usage of the products 12 months after they were offered remained high at 71 per cent and 66 per cent respectively. The *Safe Box* significantly increased spending on the target preventative healthcare expenditures by KES170 (66 per cent increase over the comparison group), while the *Lock Box* in contrast had a much smaller and statistically insignificant positive effect on the same target outcome. The total stock of savings was not measured in this study.

Usage of the other two options was higher: 97 per cent for the *Health Savings Account* (HSA), and 72 per cent for the *Health Pot* after 12 months. Both of these interventions produced strong improvements in healthcare expenditures, albeit with slightly different targets. The *Health Pot* product was designed to save up for preventative healthcare expenses (like the *Safe Box* and *Lock Box* treatments) and increased spending on preventative healthcare by KES331 (128 per cent over the comparison group). The HSA intervention was designed for emergency health spending, and had no impact on preventative health expenditures (as anticipated), but a significant 12 percentage point reduction (from a 31 per cent comparison level) in the inability to afford full medical treatment for an illness in the past three months.

The results confirm the presence of all three types of savings barriers: intra-personal, inter-personal, and intra-household.²¹ Intra-personal behavioural barriers did seem to matter significantly. Those whose savings preferences were not constant over time (as measured by survey

¹⁸ See also Giné et al. (2010), where savings balances provide a commitment device for another type of health investment: quitting smoking.

¹⁹ See also the Brune et al. (2013) and Kast et al. (2012) papers discussed in this section.

²⁰ See also Benhassine et al. (2013), on a comparison of soft versus hard commitments, in improving school attendance among beneficiaries of cash transfer programmes in Mexico: the unconditional but labelled education payment transfer ('nudge') performs better than the conditional cash transfer for educational expenses ('shove').

²¹ Inter-personal barriers were substantial—those who were previously giving assistance to others, without receiving assistance in return, benefited more than others. There was evidence of intra-household barriers as well: the effects of several of the interventions were larger (though not statistically significantly so) for married individuals. See section 2.4 for a more detailed discussion of social constraints.

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 were 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.

Although the handful of field experiments on commitment savings have focused on the development of new products and features,²² it is important to note that the popularity of some more-established products may be attributable to commitment features. For example, ROSCAs may be popular, and effective, because they allow people to commit themselves to save. Gugerty (2007) finds evidence to this effect when querying members from 70 ROSCAs in western Kenya regarding their motivations for participating. The same seems to be true for illiquid retirement savings products in more-developed countries (Laibson et al. 2010). Opt-out defaults into savings products (which are increasingly prevalent for retirement savings in more-developed countries) may be effective because they provide soft commitments that do not get undone due to procrastination or inattention (Beshears et al. 2010a).²³

Evidence on correlations between present bias and under-saving

There is a striking lack of empirical evidence on the other two key predictions of costly self-control models. In fact we are not aware of any nationally representative evidence on the conditional correlations between present-bias and (under-)saving, or on whether the high-frequency dynamics of consumption/savings decisions match a (splurge and scourge) pattern distinct to a costly self-control model.

2.5.1b Loss aversion

Loss aversion relative to some reference point (e.g., current consumption, neighbours' consumption) is sometimes invoked as potential obstacle to consumers *reducing* their debt loads (Karlán and Zinman 2012)—or, more broadly, to consumers *increasing* their savings rates (Benartzi and Thaler 2004)—but we have yet to see this intuition worked out theoretically, or tested empirically.

2.5.2 Biases in expectations (over-optimism)

Beyond preferences, *expectations* about key parameters—e.g., those affecting the budget constraint—play a key role in intertemporal choice modeling. Brunnermeier and Parker (2005) develop a theory that rationalizes over-optimism about future income based on anticipatory utility. Their model can generate under-saving; more precisely, it generates less saving than a world where people have accurate expectations of future income (because they do not get utility from anticipating higher income). We are not aware of any field tests of this interesting model.

Recently, policy and programmatic concerns have focused more on over-optimism about future cash flows more broadly, and about prices (particularly regarding underestimating the likelihood

²² See also Duflo et al. (2011), where an option to pay for next season's fertilizer input at harvest time dramatically increases fertilizer purchases, and Barrera-Osorio et al. (2011), where delaying CCT payment until school fees are due actually *increases* re-enrollment relative to earlier payment. Both of these findings are consistent with demand for commitments to save. They may also, or instead, be solving limited attention problems, as discussed in Section 2.5.4.

²³ See Kast et al. (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. Also 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 behaviour among microcredit clients in Guatemala.

of incurring ‘add-on’ prices like penalty fees). The literature on these concerns is thin, and focused on consumer debt markets in the US; see Zinman (forthcoming) for a review.

2.5.3 *Biases in price perceptions (underestimating compound interest)*

Consumers might also underestimate the value of saving more directly, even (in the extreme) when facing certain returns. For example, there may be a distinction between the vector of prices economists typically use to capture the cost-benefit of moving consumption across different periods (where, e.g., the cost is foregone consumption today, and the benefit is a return on investment), and how the consumer *perceives* that vector of prices. Stango and Zinman (2009) show that the flip side of the well-known underestimation of compound growth is an underestimation of how quickly principal is paid back on installment debt, with a more general *exponential growth bias* explaining both tendencies. They also find some evidence that more-biased households save less in a representative sample of US households.²⁴

Song (2013) tests the impact of financial education that focuses on compound interest with a field experiment that randomly assigned 1,104 households to one of three groups in Shaanxi province, China. One treatment group was taught principles of compound interest, with application to pension contributions and balances. A second treatment group was given information on expected levels of pension benefits for differing levels of contributions without compound interest being fully explained. The study finds that the group instructed on the principles of compounding improves knowledge on a financial literacy test, though the increase is not significant for most questions (except the question on compound interest on which the intervention reduces the distance from the correct answer significantly by one-sixth of a standard deviation). Both groups contributed more than the comparison group, with the principles group saving about 40 per cent more, and the information-only (no principles) group saving about 19 per cent more.²⁵

2.5.4 *Biases in problem-solving (inattention to savings)*

A fourth category of biases relates to whether and how individuals make decisions (i.e., optimize in an economic model) given their preferences, expectations, and (perceptions of) prices. For instance, to the extent that savings requires planning (e.g., making a budget), the well-known planning fallacy may come into play, whereby individuals tend to underestimate the amount of effort needed to actually complete a task. We are not aware of any field evidence linking the planning fallacy to saving behaviour (although see Spiller and Lynch 2010). Currently the leading problem-solving explanations for (under-)saving behaviour revolve around inattention to certain aspects of the tradeoffs involved in allocating consumption over time. We now consider these.

Inattention, reminders, and marketing

It seems plausible to think that spending and borrowing are more ‘top of mind’ for many people than saving.²⁶ Casual empiricism suggests that firms have stronger incentives to promote (e.g., advertise) spending and borrowing than they do saving. Shah et al. (2012) and Mani et al. (2013) postulate that extreme scarcity in one’s budget constraint—whether in time, money, etc.—can generate a laser-like focus on alleviating the immediate scarcity, at the expense of other aspects of one’s life. Since the act of saving has at best a weakly negative ability to alleviate any immediate

²⁴ See (Levy and Tasoff 2013) for a lab experiment testing the theoretical predictions of exponential growth bias.

²⁵ The author estimates that if participants maintain the same increased contribution levels going forward, this would lead to a 4.8 per cent increase in estimated consumption each year after age 60 (Song 2013).

²⁶ See DellaVigna (2009) for a review of field evidence on the nature and impacts of limited attention in other domains.

scarcity, it stands to reason that saving is likely to be neglected if scarcity does indeed affect decision quality.

Karlan et al. (2012) explores the top of mind intuition with a particular assumption that focuses on the possibility that people tend to forget ‘exceptional’ (infrequent, and relatively large) expenditure needs/opportunities à la Sussman and Alter (2012). They show theoretically that such an attention bias will lead to under-saving; conversely, if people anticipated exceptional expenses—school fees, fertilizer purchases, etc.—they would save more. In this sense limited attention is an alternative or complementary explanation for many of the phenomena discussed above, including the effects of soft commitments on behaviour. For example, health-labelled accounts might increase saving because they draw attention to future (exceptional) health expenses that would otherwise escape attention.

Indeed limited attention models generate the distinct prediction that attention shocks—e.g., reminders to save—will affect savings behaviour.²⁷ Karlan et al. (2012) tests this hypothesis,²⁸ and a hypothesis particular to their model—that reminders about exceptional expenses will be particularly effective—in field experiments with three different banks in Bolivia, Peru, and the Philippines. Each bank randomly assigned a sample of new clients with a ‘goal-based saving account’²⁹ to a reminder treatment or comparison (no-reminder) group. Reminder content varied across banks due to operational and branding considerations, and also varied randomly within banks based on hypotheses about which reminders would be most salient and effective for savers. 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 six per cent and increased the likelihood that individuals reached their saving goal by three percentage points (six per cent).³⁰

The study also finds that reminder content matters. In Peru, the bank elicited the client’s planned future expenditure, and messages in Peru only changed savings behaviour when they mentioned that client-specific plan. Messages in Bolivia were only effective when they mentioned the client’s extrinsic incentive (free insurance from the bank) for sticking to her plan. The authors infer that messages which increase the salience of the benefits of saving, whether current benefits (as in financial incentives) or future benefits (as in meeting a specific goal), are highly effective. They also emphasize that some reminder messages did not change savings behaviour, and other variations found to matter in other domains (e.g., loss vs. gain framing) did not have differential effects in this study. On a closely related note, several other studies have found that marketing content strongly affects financial behaviour, including saving.³¹

²⁷ Exogenous attention shocks will not actually affect behaviour, even if people have limited attention, if people are perfectly sophisticated about their limited attention and have access to low-cost reminder technologies.

²⁸ Many studies have tested reminders for health behaviours; see Karlan et al. (2012) for citations.

²⁹ The subjects were all people who had made some plan to save. In Philippines, banks’ clients had an account with a hard commitment: they could not withdraw funds until they had reached a pre-set goal amount. The Peruvian bank asked clients for a specific future expenditure goal and offered an eight per cent interest rate (as opposed to the normal four per cent) to clients who made and adhered to a plan for monthly deposits. The Bolivian bank account was marketed as a vehicle for saving for a ‘13th-month’ of earned income, and the bank again doubled the interest rate (3-6 per cent) and offered free life and accident insurance to clients who made and adhered to a plan for monthly deposits.

³⁰ See Kast et al.’s (2012) experiment among microcredit clients in Chile comparing the salience of in-person interaction and social pressure in peer groups, versus the effect of reminders to save that simply involve transferring information to the client on a regular basis.

³¹ Bertrand et al. (2010) find strong impacts of persuasive advertising on the take-up of expensive consumer loans in South Africa. Goda and Manchester (2013) and Choi et al. (2012) find that behaviourally-motivated direct mail and email content affects retirement plan contributions in the US. See also Mullainathan et al. (2008).

The prospect of using messaging to encourage saving is a promising one, given the relatively low costs of digital communication, the difficulty of using other levers (like opt-out defaults) in many settings, and the promising preliminary results sketched above. Future tests would do well to experiment with channel, sender (e.g., firm or peer), customization, and frequency/duration³² as well as content.³³ We suspect that variation on these margins can be used not only to optimize messaging strategies, but also to test and refine behavioural theories of attention and other factors. It is also critical to measure whether and how messaging affects net saving; does behaviour change at the household (as opposed to just the bank-/account-level), or is (competition by) messaging a zero-sum game? The Shah et al. (2012) and Mani et al. (2013) framework also raises the possibility that drawing attention to one margin (e.g., saving) could reduce decision quality in other domains (e.g., borrowing, health, etc.).

3 Taking stock of the evidence

What are we to make of the evidence so far? What does the current pattern of results tell us about the importance of constraints to saving among poor households and the welfare implications of relaxing some of these constraints? Do we have any understanding on which of our five classes of constraints appears to be most binding? In which areas are the policy and product design implications of the evidence clear and actionable, and which areas need more innovation and evaluation before we can identify what works and why?

Taking a stand on these questions when empirical testing is still very much in progress is difficult. Table 1 captures key statistics from a number of studies discussed in this paper. We emphasize that nearly all studies stop far short of welfare analysis: they measure only short-run effects, and do not tell us anything about net savings (e.g., whether there is crowd-out or crowd-in), much less about whether clients' overall financial condition and well-being improves (see Section 4 for related discussion on measurement). Nevertheless, we do find some noteworthy patterns, including real progress in the theory-testing that supports a 'diagnose and treat' approach to policy, programmatic, and profit-driven innovations.

3.1 Large impacts of savings access on income and wealth: from evidence to implications

Five studies so far find evidence of very large impacts of access to a subsidized or specialized savings product on downstream income, expenditures, and/or wealth (Brune et al. 2013; Dupas and Robinson 2013a, 2013b; Prina 2013; Schaner 2013a). Do these results replicate in other settings? If the impacts are robust, what exactly prevents households from reproducing the savings 'technology', at least approximately, informally; i.e., what is it about the new formal (or improved informal) products that dominates other informal mechanisms? It would be particularly interesting to test whether large impacts would persist in a (general) equilibrium setting where everyone has access to the same savings mechanisms. For instance, might the results thus far be driven by those with access to formal accounts stealing business from those without access (zero-sum competition)? A design that randomizes the intensity of access treatments across space or social networks holds the potential for identifying how these (or other) spillovers affect the results and the interpretation thereof.

³² Stango and Zinman (2013) finds that subtle attention shocks can have cumulative effects related to bank overdrafting behaviour in the US.

³³ Beyond persuasion and reminders, messaging/marketing may also be a relatively efficient way to deliver information, as discussed in Section 2.3.

3.2 Gaps between take-up, usage, and impacts

Take-up rates for products with commitment features tend to run in the 20-30 per cent range. Take-up rates are sometimes higher for no-frills accounts, especially when the accounts are subsidized. A take-up rate north of 20 per cent is quite high by the standards of a new product launch, particularly in retail financial services (consider, for example, the slow adoption of ATMs, credit and other payment cards, and online banking in the U.S.). But even 20 per cent *could* be too low, normatively speaking, given the large positive impacts of (commitment) account access described above. The possibility of sub-optimally low take-up is certainly worth further scrutiny, given the potential for the various classes of constraints discussed above to depress take-up. For example, it may be the case that a lack of sophistication (about how to manage one's self-control problems) depresses demand for harder commitments; the pattern of higher take-up of softer commitments is consistent with this. Of course it may simply be the case that the impacts of account access are quite heterogeneous, with individuals sorting themselves efficiently into or out of the market.

Another striking pattern is the gap between take-up and usage. The usage rate, even defined leniently as making two or more deposits in the first year of account ownership, only exceeds half of the take-up rate in one study involving formal bank savings accounts (Prina 2013), excluding the high usage rates seen for informal savings products (Dupas and Robinson 2013b), that is, most account-openers do not become account-users. Moreover, initial usage typically quickly depreciates into inactivity after six months or so. Future studies would do well to unpack the drivers of these patterns. Does learning play an important role? Do transaction costs become more important over time (e.g., as subsidies are removed)? Do procrastination and/or inattention take over once the initial 'on-ramp' or burst of salience/excitement is removed? If so, can follow-up communication strategies (delivered, for example, via SMS) drive continued engagement with the product and productive savings behaviours?

3.3 Soft commitment devices hold promise

Hard commitment devices that tie the saver's hands to a target goal (either a date or an amount or the purchase of a particular item) seem to be less effective in many settings than commitment devices that allow for some flexibility in how the money is ultimately used. Dupas and Robinson (2013b) and Brune et al. (2013) find more money saved toward exceptional but predictable health and agricultural investments respectively through the more flexible commitment accounts offered, compared to the accounts that have more restrictions in how and when the money is withdrawn and for what purpose it is used.³⁴

Given the risks and uncertainties that poor households face on an ongoing basis, the option value of withdrawing money when needed may outweigh, for many, the benefits of committing to long-term savings. The basic premise of a commitment device is the voluntary increase of the future price of vice. In the case of savings, the vice is the withdrawal of funds to spend on tempting items, rather than save for longer term goods. The evidence suggests that if the price is raised too high, the participation constraint will bind, and people will not open or use the account. Similarly, people want the increased future price of vice (i.e., the rules for withdrawing funds) to be state-contingent:

³⁴ Similarly, preliminary results from a study on saving for school expenditures in Uganda show that a weak commitment device is effective for generating savings for school expenditures (and positively impacting test scores), whereas a strong commitment account is not effective. For details on this study, see 'Smoothing the Cost of Education: Primary School Saving in Uganda' (<http://poverty-action.org/project/0079>).

in the case of an emergency, they want flexibility.³⁵ In some implementations, this means that the only increase in price comes from psychic costs, much more in line with mental accounting models, in which deviating from one's planned savings incurs no pecuniary or time costs with respect to the bank account, but rather just leads one to be disappointed with oneself for deviating from one's plan without good cause.

3.4 Differences in expenditure preferences and bargaining power influence household savings

Nearly every study highlights some form of heterogeneity in impacts. Sometimes these are theory-driven and anticipated; often they are discovered ex-post at the analysis stage. The effectiveness of offering savings accounts seems to be driven in large part by who the users are.

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 behaviour, is attracting particular and deserved attention. The results thus far suggest strongly that intra-household preference and bargaining power heterogeneity depresses savings rates. A handful of antidotes to this have been tested, with mixed results. 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 improve 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. Yet in one study that tests for this mechanism Brune et al. (2013), 'other-control' treatments do not impact savings behaviour as hypothesized.

3.5 Small monetary subsidies can have long-term impacts

A few studies have highlighted how small monetary subsidies, when provided by the research team to pay for the opening fees, minimum balance deposit, or as interest payments to encourage higher savings balances, have a substantial impact on the take-up of formal savings accounts. The most surprising and promising result though is that these small and time-bound subsidies can lead to long-term impacts on welfare (Schaner 2013a). There is an obvious need for more long-term studies to test whether such positive impacts a few years from account-opening do replicate across settings, and why the effects might persist in this way.

3.6 Peer power

The popularity of ROSCAs and other informal/less-formal group-based saving mechanisms, combined with several recent results on peer influence over savings decisions, speaks to the potential of unlocking the power of peers. Much remains to be identified about whether, when, and how peers influence savings decisions (by providing information? attention? soft commitment? or through other mechanisms). Is herding on bad information or norms a real concern? Can financial institutions capture/bottle (some) beneficial peer effects remotely, without imposing the substantial transaction costs involved in higher-touch approaches (that involve, e.g., regular group meetings)?

³⁵ This may also align with the distinctions people draw between precautionary or emergency savings and saving for lump sums and investment, for each of which desired levels of commitment might vary.

3.7 Rethinking the role of financial literacy

There is little evidence to suggest that standard, and increasingly widespread, programmatic approaches to building financial literacy are (cost-) effective at improving savings decisions. Above we highlight several alternative approaches to improving financial knowledge and decision-making, many of which attempt to leverage basic behavioural and operational insights.

3.8 Simultaneous saving and borrowing

Simultaneous saving and borrowing has received too little attention from researchers and policy makers. In practice, many MFIs encourage, or even force, their loan clients to engage in the costly practice of simultaneously saving. On its face, this practice of borrowing at high interest rates while saving at much lower interest rates is bad economics for MFI clients: why not just borrow less? MFIs and other stakeholders often rationalize the practice by arguing that the process of accumulating savings builds long-run habits that persist after the loan has been paid off. Testing this hypothesis is critical. We would also test whether there are other ways to build habits that are less costly for the client. For instance, could regular loan payments not be made a ‘habit’ that can be transferred to ‘paying oneself’ (i.e., saving) once the loan is paid back? Combining this associative-framing approach to habit formation with a soft upfront pre-commitment to continue making payments, to oneself, post-loan is a promising approach that we have piloted in the US and are looking to expand.

4 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.

4.1 Measurement issues

- *Savings vehicle substitution:* 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).
- *Stocks and/or flows?* 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.
- *Single snapshots miss dynamics:* 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 requires measuring savings balances at multiple points in time.

- *Inference when there is measurement error*: 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—that is, income-generating—one can at least compare discounted consumption, and determine under which discount rates household welfare increases. When the durable good is a consumption item, however, the welfare implication typically resorts to assumptions using revealed preferences.
- *Noisy accounting: how is saving funded?* 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, and (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 to measure, 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.

4.2 Methodological issues

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

- *Formal vs. 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 2013a; Prina 2013).
- *Product design tests*: Change the design of a savings product, thereby exogenously increasing savings balances—for example through a commitment device—one can compare the difference in outcomes between groups with different level of savings (Ashraf et al. 2006a; Brune et al. 2013).
- *Non-product interventions that aim to change savings behaviour*: This includes ‘nudges’, such as reminders to save, as well as financial education interventions (Karlan et al. 2012; Song 2013).

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.

5 Conclusion

The evidence on the impact of expanding savings access is promising and spans a range of development goals, from impacting empowerment and decision-making (Ashraf et al. 2010), to increasing resistance to health shocks (Dupas and Robinson 2013b), to promoting entrepreneurial investment and activity (Dupas and Robinson 2013a), 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 individual and household decision-making, market functioning, and frictions, and the interactions between the three. 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 research designs that build theory-testing into the evaluation of innovations or interventions that seek to drive savings behaviour.

One approach to this is to develop testable predictions around heterogeneous responses to savings treatments. Prior work suggests that gender, intra-household bargaining power, risk preferences, and behavioural factors are all important mediators of treatment effects, and further theory and evidence is needed to flesh out how best to match different types of people, 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.

1. *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 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; for instance, 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.
2. *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; for example, how different marketing, or product design, may help ameliorate such issues. Similarly, can better information on deposit insurance requirements and other prudential regulations 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? A number of recent studies highlight the rapid rise in mobile phone adoption and airtime transactions across most African countries and they describe the lower KYC barrier to entry as an ingredient in this rapid expansion (Aker and Mbiti 2010; Davidson 2011; Jack and Suri 2011). How 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?
3. *Information and knowledge gaps*: Mounting evidence suggests that the increasingly standard, programmatic approach to financial education is misguided, at least for adults. Whether aiming to build literacy or simply to deliver key pieces of information, stakeholders should consider more targeted, focused, and timely interventions (for example, those that are linked to product purchases). Interventions need not be programmatic either: marketing,

messaging, and social learning may be more (cost-) effective levers. We certainly need more studies that vary delivery channel/timing and/or content, within the same sample. Many other critical questions remain, including: how to harness 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 toward better savings practices? How effective are product-specific information programmes 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?

4. *Social constraints:* There is some evidence suggesting that individuals may make inefficient choices on savings and investment allocations in order to prevent leakage to expectant social networks. Savings decisions within the household may also be mediated by costly strategic behaviour that reduces efficiency and creates concerns about inequity (where bargaining power is unequally distributed). We need to develop better models of how household savings decisions are made as collective, not individual, decisions. How do individuals who share a budget develop common savings norms to minimize inefficient bargaining 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? A key question on which the jury is still out concerns the way formal savings instruments interact with and influence sharing norms and informal insurance through traditional social networks. Where is crowding-out occurring and where are complementarities to be found?
5. *Behavioural biases:* Much remains to be done to understand how best to meet behavioural consumers 'where they are', cognitively speaking. Remarkably little is known about which behavioural biases actually drive savings behaviour, and whether and how different biases interact with each other. This has potential implications for product design; for instance, 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 and the use of a behavioural intervention like a commitment device or default option.

Another key line of inquiry on the behavioural side is exploring how to optimize a seductively simple behavioural 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 behaviour 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.

Lastly, the introduction of mobile banking introduces various ways to make savings simpler. Jack and Suri's (2011b) panel survey that tracks the adoption and use of mobile-banking in Kenya

reports that the share of user-households who ‘withdraw funds immediately’ from their mobile money (M-PESA) account fell from 56 per cent in the first survey round (August–October 2008) to 21 per cent in the fourth survey round (March–June 2011). A general rule of behavioural economics: the simpler a task, the more likely it is to be done. In particular, with an increasing number of direct deposit payments (digital payment transfers from cash crop buyers, remittances, incoming cash to a retail vendor, etc.), there are now more ways to automate financial transactions—that is, to automate what happens to the incoming cash. Does it get put aside? Does it get labeled? Does it get automatically paid out to specific uses? These are all opportunities to embrace the reality of human behaviour, to ‘nudge’ people to decisions that they themselves would say they want to make, if in a moment of self-reflection.

Developing countries are also promising places to address key unanswered questions on other prominent ‘pro-savings’ interventions like default options, and kitchen-sink behavioural 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 behavioural pathways that yield insights for the development of financial products and other interventions more broadly?

In evaluating the impact 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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Table 1: Key statistics from studies evaluating savings impact in the developing world

Study, Country	Treatment	Measurement timeframe	Take-up of savings account (share of the entire treatment group)	Active usage of savings account (share of the entire treatment group)	Increase in savings balance (% or level increase over the comparison group)	Crowd-out of savings	Increase in outcomes (% increase over the comparison group)
Dupas and Robinson (2013a), Kenya	Reducing opening fees for a simple bank savings account	6 months	87%	41% (2 or more transactions)	KES9.36 increase in daily average bank savings	No crowding-out	37% increase in daily private expenditures; 38-56% increase in average daily business investment
Prina (2013), Nepal	Reducing opening fees and reducing distance to transaction point for a simple bank savings account	1 year	84%	80% (2 or more deposits)	25% increase in monetary assets	No crowding-out	20% increase in educational expenditures; 15% increase on fish and meat expenditures; smaller reduction in weekly income when hit by a health shock
Cole et al. (2011), Indonesia	Varying subsidies to open simple bank savings accounts	2 years	Low incentive: 3.5%; Medium incentive: 8.9%; High Incentive: 12.7%				
Dupas et al. (2012), Kenya	Reduce opening fees for a simple bank savings account	1 year	62%	18% (2 or more deposits)			
Schaner (2013c), Kenya	Reduce issuing fee for an ATM debit card (reduces withdrawal fee by half)	6 months	Savings account take-up: 100% (by design); ATM card take-up: >86%	22.7% (1 or more transactions)			
Schaner (2013b), Kenya	Varying interest rates and intra-household ownership of simple bank savings accounts	6 months	100%	43% (1 or more transactions)			

Schaner (2013a), Kenya	Varying interest rates on simple bank savings accounts (long-run impacts)	6 months; 3 years	High-interest rate: 49.2% Low-interest rate: 31.4%	High-interest rate: 14.7% (1 or more transactions over first 6 months); 11.7% (1 or more transactions 24-36 months after account opening)			US\$15 in higher monthly income for individual accounts offered the high interest rate
Karlan and Zinman (2013), Philippines	Varying interest rates and intra-household ownership of commitment savings accounts	20 months	23%	9% (1 or more deposits)			
Ashraf et al. (2006b), Philippines	Door-to-door deposit collection service	15 months	28%	14.2% (1 or more deposits)	40% increase in savings stock		
Chin et al. (2011), US-Mexico	Assistance to undocumented migrant workers to obtain an ID card required to open a bank savings account	5 months	ID card: 87% Savings account: 43%		9 percentage point increase in total savings as a share of income	No crowding-out	Those in the treatment group who lacked control over how remittances were spent increase their income by US\$575 (14%)
Seshan and Yang (2013), Qatar-India	5-hour financial literacy workshop	1 year			72.4% increase in migrant's savings		
Ashraf et al. (2010), Philippines	Goal-based commitment savings account	1 year; 2.5 years	28%				0.14 SD increase on an index of decision-making power among married women; Among women with below-median decision-making power at baseline, increase in expenditure on female-oriented consumer durables by PHP1457
Ashraf et al. (2011), US-El Salvador	Savings accounts with varying degrees of control over remittances for El Salvadorian emigrants in the US	6 months	Recipient account: 22.9%; Joint account: 28.3%; Joint and migrant account: 39.6%		For participants who had demand for control of funds, 244% increase in total savings for the joint and migrant account treatment	No crowding-out	

Brune et al. (2013), Malawi	Commitment and ordinary savings accounts tied to tobacco crop sales	1.5 years	Ordinary account : 18%; Commitment account and ordinary account: 21%	Ordinary account: 18%; Commitment account and ordinary account: 21%	Ordinary account: 573% increase in deposits in project accounts; Commitment account and ordinary account: 503% increase in deposits in project accounts		Among those offered the Commitment account and the ordinary account: 7.7% increase in land cultivation; 17.1% increase in agricultural inputs; 20.1% increase in agricultural output; 13.5% increase in household expenditures after the next harvest
Ashraf et al. (2006a), Philippines	Goal-based commitment savings account with early-withdrawal penalties	1 year	28%	~14% (1 or more deposits)	82% increase in total savings balance	No crowding-out	
Dupas and Robinson (2013b), Kenya	Health-oriented informal savings devices with varying levels and types of commitment	1 year		Safe Box: 71%; Lock Box: 66%; Health Pot: 72%; Health Savings Account: 97%			66-75% increase in preventative health investments for Safe Box treatment; 128-138% increase in preventative health investments for Health Pot treatment; 12 percentage point reduction in the likelihood of being unable to afford medical treatment (on a base of 31%) for HSA treatment
Song (2013), China	Financial education (around explaining the principles of compound interest) related to investing in the government-subsidized pension system		Education (teach principles): 99% Calculation (information-only): 98%		Education: 40% increase in pension contributions; Calculation: 19% increase in pension contributions		4.8% increase in estimated consumption each year after age 60 from Education treatment
Karlan et al. (2012), Philippines, Bolivia, and Peru	SMS and letter reminders to save				6% increase in total savings balance		

Source: Authors' construction from individual articles.