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Price and control elasticities of demand for savings

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ABSTRACT

A Philippine bank tested sensitivity to interest rates and account ownership requirements in 10,000 randomized door-to-door solicitations for a commitment savings account. Take-up is substantial (23%), but price elasticity of saving in this account is not significantly different from zero in either the full sample or sub-groups of plausibly marginal savers. The upper bound is less than 0.5 in the full sample, and exceeds 1.0 in only 1 of 22 sub-groups. Nor do we find sensitivity to ownership requirements.

1. Introduction

Drivers of savings demand underlie workhorse models in intertemporal choice and intrahousehold bargaining. They also underlie policy design on asset-building, capital mobilization, and financial security. For financial institution strategy, savings instrument pricing and product design are critical for maximizing profits and managing liquidity and risks.[1]

One key intersection of modeling, public policy, and business practice is efforts to expand access to formal savings products in developing countries. Several recent randomized evaluations estimate the effects of newly introduced savings accounts by comparing those offered access to an untreated control group. Some of these accounts offer only basic safekeeping and transaction services (Dupas et al., 2016; Kast and Pomeranz, 2014; Prina, 2015), and many offer commitment features as well (Ashraf et al., 2010; Brune et al., 2016; Duflo et al., 2011; Dupas and Robinson, 2013a, 2013b; Karlan and Linden, 2016; Schaner, 2016).[2] Many of these studies find positive impacts on saving and on downstream impacts like investment, income and expenditures, health, education, and female empowerment.

Given the mounting evidence that increasing access to savings accounts produces benefits for poor households, it is important to examine whether unsubsidized optimization of savings account pricing and/or product features is an effective strategy for expanding usage of formal savings devices. The answer may be yes if households have elastic demand with respect to the relevant margins. Yet there is relatively little empirical evidence on how demand responds to market-driven variation in savings account yields and features, as existing randomized studies of consumer price sensitivity have examined only subsidized yields.[3] Studies of subsidized yields are helpful for assessing government policies, but the magnitude of their identifying price variation is far outside the range of most financial institutions' choice sets, and often includes potentially important ancillary benefits like tax reductions. To take one example, Duflo et al. (2006) compares a market rate (no match) to 20% and 50% matches in Individual Retirement Arrangement accounts. Comparing savings balances in their 20% and 50% match groups, we infer a price elasticity of 0.55.

Our paper provides evidence on whether the emerging stylized fact of price sensitivity at highly subsidized yields holds within a range of market-viable yields for shorter-term savings.

First Valley Bank in the Philippines, a for-profit institution, made over 10,000 commitment savings account offers in a door-to-door marketing campaign, with randomized pricing and individual/joint ownership options, in rural and peri-urban Philippines. The sample frame, although

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[1] For small balance accounts, fixed costs of servicing accounts are often considered first-order cost drivers, yet interest rate elasticities may matter as well, particularly for an analysis of costs for mobilizing savings (see Maisch et al., 2006).

[2] Commitment features include withdrawal restrictions (Ashraf et al., 2010), automatic deposit of harvest proceeds (Brune et al., 2016), high withdrawal fees (Dupas and Robinson, 2013a), earmarking (Dupas and Robinson, 2013b; Karlan and Linden, 2016), and large subsidies conditional on saving (Schaner, 2016).

[3] Kast et al. (2016) compares a market rate, 0.3%, to 5.0%. Schaner (2015, 2016) compares a market rate, 0%, to 4%, 12%, and 20%. In the U.S., Mills et al. (2008) and Grinstein-Weiss et al. (2013) compare a market rate to 100%–200% (1:1 or 2:1 matches) in Individual Development Accounts. Cole et al. (2011) and Dupas and Robinson (2013a) randomize account-opening subsidies, but not interest rates. The economics of banking literature has examined price sensitivity in the United States, using market variation to estimate conditional correlations between deposit market share and yields paid at the bank level (Adams et al., 2007; Dick, 2008). These studies find elastic demand but rely on yield variation that is likely correlated with unobserved determinants of market share.

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not explicitly randomly sampled from a census, was generated by first selecting all villages within the catchment area of the bank, and then conducting a door to door marketing exercise to all homes with someone present and willing to talk to a marketer from a bank. This leads to a sample frame with both rural and peri-urban households, and both middle-class and poor neighborhoods. The commitment features include a goal of amount and date set by the individual (typically something under a year), and a withdrawal restriction: funds are not available for withdrawal until the goal amount and date have been reached (with exceptions for emergencies granted by the bank). Clients set a goal amount and target date and face withdrawal restrictions until both the goal amount and target date have been reached.[4]

23% of individuals took-up an offer. We estimate the price sensitivity of demand for saving in this account using the bank's randomization, at the individual offer level, of potential clients into one of three price conditions: (1) the Bank's "normal" rate (e.g., 1.5% APY on balances up to $200 over 3–11 months), (2) a "high" rate that the Bank was considering offering, that was 1.5% APY above its normal rate, (3) the high rate, but only conditional on the client meeting her self-set goal amount (ranging from $40 to $2000), within her self-set time period (ranging from 1 to 24 months). These prices are unsubsidized and within the range offered in the market.

Our setup uses unsubsidized and marginal variation in prices (and account features) to estimate demand sensitivities. Other strengths/novelties of our setup include clean identification of a price (i.e., a substitution) effect that is not confounded by potential income or wealth effects (since the interest rate differential is too small to generate an income effect in one treatment arm, and both too small and paid out too late in the other treatment arm). Furthermore, door-to-door marketing provides for a fairly representative sample frame; thus we include those who already have savings accounts, as well as those likely to be credit constrained.

Our setup also has some methodological weaknesses. We only capture partial equilibrium and micro effects, not general equilibrium and aggregate effects. We lack data on savings outside the experimenting bank, although this does not end up affecting our inferences given the lack of demand sensitivity to the prices and features tested by the experimenting bank (conversely, if we found sensitivity, one would wonder about crowd-out). Furthermore, few people in our setting have relationships with multiple financial institutions; hence any substitution in savings would likely be from informal savings to formal savings, not from one formal account to another. The external validity of our results to other populations of interest is uncertain, although we can use within-sample variation in baseline savings, income, wealth, education, etc. to engage in some informed speculation. The external validity of our results to other savings/investment vehicles may be limited, given that these are experiments with a commitment savings account, not a fully liquid savings account.[4] But commitment products are interesting in and of themselves, given their prevalence in the developing world (Ashraf et al., 2003) and longstanding prominence in richer countries (certificates of deposit, 401k's, etc.)

Our results suggest price-inelastic demand for this commitment savings product within the price range tested, regardless of specification. Even the upper bounds of our confidence intervals imply price elasticities less than 0.5. And these upper bounds are themselves upper bounds of elasticity with respect to aggregate savings, assuming some substitution across savings vehicles, since we measure savings only in a single account (using the bank's administrative data), rather than net savings from the household's complete balance sheet or income statement.

A key question is whether other features of the bank, product or financial system studied here render marginal price variation irrelevant. For example, we would hesitate to infer much about price sensitivity from a savings product that had very low take-up due to other features that were unattractive. But the take-up rate of 23% here is on par with take-up rates from studies that introduce new unsubsidized savings accounts to individuals in developing countries (Karlan et al., 2014). We also note that demand correlates strongly with marketer fixed effects and offer timing. This shows that non-price inputs matter for the bank optimization problem, and is consistent with results for example from Bertrand et al. (2010) in which marketing treatments were more influential than price in determining demand for credit.

Besides non-price product characteristics, we also consider whether characteristics of our *sample* (e.g., liquidity constraints) drive the finding of price inelasticity. We do not find evidence of such heterogeneity. Households who are plausibly on the margin of saving (more) in this account, as measured using a short baseline survey, are also unresponsive to the variation in price and ownership requirements. Of particular note, we find no significant responses among those with (or without) savings at baseline; prior savings[5]; relatively high wealth, income, or education; present-bias as elicited using standard survey questions[6]; or relatively high intra-household decision power.

We also estimate elasticities with respect to the account ownership requirement, which the bank randomly assigned among married individuals to: individual account only, joint only, or the choice of individual or joint (the standard option).[7] The demand for financial control is important to pro-savings female-focused policy efforts (Hashemi et al., 1996), to financial institutions interested in the optimal design of savings products, and to models of intra-household decision making (e.g., Anderson and Baland (2002), Anderson and Eswaran (2009), Ashraf (2009), Schaner (2015)). In such models, requiring joint ownership can strictly reduce savings demand if there are bargaining failures due to, e.g., limited commitment.

We do not find significant ownership requirement elasticities in the full sample, despite the fact that when offered the choice between individual and joint accounts in the "choice" arm, 89% choose individual. So it seems that people (very) weakly prefer individual accounts, but not to the extent that a take-it-or-leave-it offer of joint account discourages them from saving. Nor do we find strong evidence of significant ownership elasticities across two dozen different sub-groups. In particular, we find no evidence that ownership requirement sensitivity varies with baseline measures of intra-household decision making power. It may be the case that a commitment account itself increases decision power (Ashraf et al., 2010) and/or mitigates the underlying bargaining inefficiency—by, e.g., making it easier to monitor withdrawals—in a way that a more liquid account would not. For instance, the external validity of our finding (to more liquid accounts) is uncertain, and a topic for future research.

In all, we do not find strong evidence that savings demand responds significantly to either price (yield) or to account ownership requirements. Note that it is not simply the case that demand was low: the take-up rate was 23%. Nor is the case that demand is completely unresponsive to all observables; rather, we find strong conditional correlations between demand and several types of variables—baseline individual characteristics, marketer fixed effects, and offer timing.

[4] First Valley Bank allows emergency withdrawals in cases of documented "severe emergency—defined only as 1) hospitalization of immediate family member; or 2) death of immediate family member. The only other case allowing early withdrawal is if the client moves to a barangay where there is no 1st Valley Bank branch." 0.8% of the commitment accounts opened during this study took early withdrawals.

[5] We find some evidence consistent with heterogeneity by asset market participation a la Vissing-Jorgensen (2002) and Guvenen (2006), in that those who have saved before have more elastic demand than those who have not, but even the upper bounds of the larger elasticities are economically small.

[6] Ashraf et al. (2006) finds, in the same geographic area but with a different bank, that those who answered time preference questions inconsistently, exhibiting more patience in the future than now, were more likely to *take-up* commitment savings accounts.

[7] The bank made account offers privately, to individuals.

Table 1
Baseline sample characteristics, and orthogonality of treatment assignments.

	Full Sample	Interest Rate Treatment			P-value from F-test of joint significance of (2) and (3) relative to (4)	Account-Ownership Treatment			P-value from F-test of joint significance of (6) and (7) relative to (8)
		Regular	High	Reward		Single	Joint	Option	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Baseline Survey Variables - Means and Standard Errors									
Female	0.673	0.673	0.663	0.683	0.229	0.669	0.664	0.685	0.142
	(0.005)	(0.008)	(0.008)	(0.008)		(0.008)	(0.008)	(0.008)	
Married	0.640	0.644	0.640	0.636	0.761	0.634	0.639	0.646	0.574
	(0.005)	(0.008)	(0.008)	(0.008)		(0.008)	(0.008)	(0.008)	
Age	34.076	34.287	34.080	33.860	0.385	34.089	34.005	34.133	0.914
	(0.126)	(0.219)	(0.217)	(0.217)		(0.220)	(0.217)	(0.216)	
Education $\geq$ some college	0.443	0.443	0.444	0.443	0.994	0.452	0.432	0.445	0.254
	(0.005)	(0.009)	(0.009)	(0.009)		(0.009)	(0.009)	(0.008)	
High wealth (owns home with high quality materials)	0.252	0.254	0.251	0.250	0.943	0.260	0.242	0.252	0.207
	(0.004)	(0.008)	(0.007)	(0.008)		(0.008)	(0.007)	(0.007)	
Income $\geq$ median (in-sample)	0.503	0.507	0.510	0.492	0.276	0.492	0.496	0.520	0.051*
	(0.005)	(0.009)	(0.009)	(0.009)		(0.009)	(0.009)	(0.009)	
Ever saved at home or (in)formal institutions	0.746	0.739	0.752	0.746	0.472	0.748	0.738	0.750	0.495
	(0.004)	(0.008)	(0.007)	(0.008)		(0.008)	(0.008)	(0.007)	
Ever saved formally	0.300	0.298	0.299	0.304	0.830	0.307	0.301	0.294	0.506
	(0.005)	(0.008)	(0.008)	(0.008)		(0.008)	(0.008)	(0.008)	
Satisfied with current savings	0.537	0.530	0.552	0.527	0.074*	0.525	0.542	0.542	0.260
	(0.005)	(0.009)	(0.009)	(0.009)		(0.009)	(0.009)	(0.009)	
Current savings amount (pesos)	8808.58	8562.62	8561.00	9308.97	0.845	7923.40	9788.58	8716.54	0.353
	(539.76)	(868.64)	(739.15)	(1156.0)		(579.43)	(1228.1)	(885.23)	
Present-bias	0.182	0.183	0.178	0.184	0.823	0.182	0.176	0.187	0.530
	(0.004)	(0.007)	(0.007)	(0.007)		(0.007)	(0.007)	(0.007)	
Impatient	0.408	0.410	0.411	0.403	0.753	0.406	0.404	0.414	0.675
	(0.005)	(0.009)	(0.008)	(0.009)		(0.009)	(0.009)	(0.008)	
Intra-household decision power v1 (possible range is [0,6])	2.417	2.449	2.399	2.403	0.543	2.392	2.406	2.451	0.463
	(0.021)	(0.036)	(0.035)	(0.036)		(0.036)	(0.036)	(0.035)	
Intra-household decision power v2 (possible range is [0,3])	1.713	1.733	1.703	1.703	0.591	1.703	1.706	1.729	0.709
	(0.014)	(0.024)	(0.024)	(0.024)		(0.024)	(0.024)	(0.024)	
Panel B: Multinomial Logit of Treatment Assignment on Survey Variables									
P-value from Likelihood Ratio Chi-Square Test of joint significance of survey variable coefficients for interest rate treatment					0.801				
P-value from Likelihood Ratio Chi-Square Test of joint significance of survey variable coefficients for account-ownership treatment					0.321				
Panel C: Multinomial Logit of Interest Rate Treatment on Account-Ownership Treatment									
P-value from Likelihood Ratio Chi-Square Test of joint significance of interest rate treatment coefficients					0.475				
Number of Observations	9992	3329	3367	3296		3275	3283	3434	

Notes: *p < 0.10 **p < 0.05 ***p < 0.01. Huber-White standard errors are shown in parentheses. Present-bias is a binary variable indicating whether respondent is less patient, in hypothetical sooner-lesser vs. larger-later choices, when making a choice between today or 1 month from today than when making a choice between 6 months from today or 7 months from today. Impatient is a binary variable indicating if respondent chooses the sooner-lesser amount when faced with choice of today vs. 1 month from today. "Intra-household decision power v1″ is a sum of three survey responses on who makes household decisions (appliance acquisition, personal things acquisition, and family support), with two points given if answer is myself; one point if both; and zero point otherwise. "Intra-household decision power v2″ gives one point if answer is myself or both and zero point otherwise. In multinomial logits, base outcomes are regular interest rate and single account only treatments. The multivariate logits in Panel B include the v1 but not the v2 variable. $1 ≈ 40 Philippine pesos during our sample period.

2. Experimental design and implementation

First Valley Bank (FVB), a for-profit bank operating in Western Mindanao, Philippines, worked with us to randomize interest rates and account ownership requirements as part of the rollout of its Gihandom (Dream) Savings product. The bank was interested in testing this new product and in expanding its market reach by offering this new product to new customers.

2.1. Product terms, marketing, sample frame, and baseline surveys

Gihandom allows a client to set her own savings goal amount (US$50 or above, $1 ≈ 40 Philippine pesos during our sample period) and goal term (from three months to two years). Once the client opens the account with a minimum deposit of US$2.50, there is no fixed deposit schedule to fulfill. The client receives a savings lockbox and is encouraged at sign-up to make small deposits on a daily basis. The bank holds the key to the lockbox (although a determined individual could break into the lockbox without too much difficulty). When the lockbox is full, the client goes to the bank to deposit the money. The account is designed to be illiquid, as a commitment device: money can be withdrawn only after both the goal amount and the goal date have been reached, except in hardship cases.[8] In this sense the Gihandom accounts are similar to other types of accounts with provisions that make early withdrawal costly, like certificates of deposit (CDs) and retirement accounts (e.g., IRAs, 401(k)s). The Gihandom account is also similar to the SEED account, tested by Ashraf et al. (2006) by a different bank but also in Mindanao. For SEED, the goals were *either* amount *or* date based, whereas the Gihandom account requires both an amount and date goal be set.

Between April and August 2007, bank employees conducted door-to-door marketing in rural and small urban areas and offered 9992 individuals the opportunity to open one or more Gihandom accounts. Marketers conducted a brief five to ten minute "baseline" survey prior to

[8] 0.8% of account holders withdrew balances early.

Table 2
Is demand correlated with observables?.

	Average Balances Over 12 Months Post-Treatment Assignment							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Take-up	Balance	Balance (censored at 95th percentile)	Balance (censored at 99th percentile)	Balance ≥ 1000 pesos	Log (Balance)	Reached goal	Opened account and made any transaction beyond opening
Mean of dependent variable	0.227	190.63	107.85	158.05	0.06	5.64	0.044	0.095
Female	0.117***	91.35***	64.52***	89.71***	0.04***	0.11	0.029***	0.057***
	(0.008)	(21.256)	(6.113)	(10.703)	(0.005)	(0.075)	(0.004)	(0.006)
Education ≥ some college	0.053***	41.32*	24.49**	27.54*	0.01**	−0.04	0.005	0.025***
	(0.009)	(20.550)	(6.973)	(12.033)	(0.005)	(0.061)	(0.005)	(0.007)
High wealth (owns home with high quality materials)	0.040***	14.16	29.17***	43.26_1**	0.02**	0.10	0.009	0.025**
	(0.011)	(26.788)	(8.767)	(15.692)	(0.007)	(0.069)	(0.006)	(0.008)
Income ≥ median (in-sample)	0.080***	90.26***	3960.***	63.13***	0.02***	0.07	0.022***	0.038***
	(0.009)	(22.746)	(6.812)	(11.575)	(0.005)	(0.070)	(0.005)	(0.006)
Ever saved at home or (in)formal institutions	0.018	−7.89	10.75	18.43	0.01	0.08	0.039	−0.010
	(0.037)	(57.528)	(30.993)	(48.765)	(0.024)	(0.291)	(0.022)	(0.028)
Ever saved formally	−0.025*	−8.68	7.31	11.35	0.00	0.14	0.006	0.018
	(0.012)	(37.410)	(9.890)	(17.509)	(0.008)	(0.077)	(0.007)	(0.009)
Baseline savings amount - quintile 1 (omitted category: amount = 0)	0.014	−11.21	−12.74	−31.33	−0.02	−0.27	−0.039	0.009
	(0.038)	(57.271)	(31.494)	(49.175)	(0.024)	(0.296)	(0.023)	(0.028)
Baseline savings amount - quintile 2	0.058	62.94	22.83	24.15	0.01	−0.04	−0.025	0.039
	(0.038)	(57.844)	(31.544)	(49.547)	(0.024)	(0.289)	(0.023)	(0.028)
Baseline savings amount - quintile 3	0.080*	134.04	34.48	46.73	0.02	−0.06	−0.014	0.042
	(0.038)	(75.885)	(31.784)	(50.233)	(0.025)	(0.288)	(0.023)	(0.029)
Baseline savings amount - quintile 4	0.092*	108.28	22.47	38.01	0.01	−0.16	−0.029	0.031
	(0.038)	(61.183)	(31.764)	(50.399)	(0.025)	(0.289)	(0.023)	(0.028)
Baseline savings amount - quintile 5	0.147***	286.53***	69.50*	135.58*	0.04	0.06	−0.010	0.069*
	(0.039)	(81.412)	(33.144)	(53.869)	(0.026)	(0.295)	(0.024)	(0.030)
Baseline savings amount - missing values	0.076	−16.46	−12.26	−41.54	−0.02	−0.68*	−0.036	0.003
	(0.048)	(66.294)	(36.352)	(55.225)	(0.028)	(0.344)	(0.026)	(0.034)
Satisfied with current savings	−0.014	−34.37	−5.11	−14.06	−0.00	0.05	−0.005	−0.006
	(0.009)	(24.121)	(7.165)	(12.275)	(0.006)	(0.074)	(0.005)	(0.007)
Present-bias	−0.001	−29.59	6.28	2.94	0.01	0.01	0.005	0.007
	(0.012)	(36.278)	(9.575)	(16.687)	(0.007)	(0.100)	(0.006)	(0.009)
Impatient	−0.063***	−37.50	−30.76***	−40.10**	−0.018**	−0.01	−0.014**	−0.030***
	(0.010)	(32.627)	(7.841)	(14.162)	(0.006)	(0.087)	(0.005)	(0.007)
Intra-household decision power v1	0.006*	7.14	3.61*	6.29*	0.00	0.01	0.001	0.004*
	(0.002)	(4.614)	(1.737)	(2.958)	(0.001)	(0.014)	(0.001)	(0.002)
P-value from F-test of joint significance of baseline savings amount coefficients	0.000	0.000	0.000	0.000	0.000	0.012	0.017	0.000
P-value from F-test of joint significance of marketer coefficients	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.000
P-value from F-test of joint significance of week of offer coefficients	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000
P-value from F-test of joint significance of neighborhood coefficients	0.000	0.517	0.109	0.406	0.303	0.000	0.000	0.008
R-squared	0.163	0.043	0.084	0.069	0.055	0.056	0.043	0.079
Observations	9992	9992	9992	9992	9992	2265	9992	9992

Notes: *p < 0.10 **p < 0.05 ***p < 0.01. Each column reports results from a single OLS regression of a demand measure on the baseline variables shown or summarized in the rows. Robust standard errors are shown in parentheses. Present-bias is a binary variable indicating whether respondent is less patient, in hypothetical sooner-lesser vs. larger-later choices, when making a choice between today or 1 month from today than when making a choice between 6 months from today or 7 months from today. Impatient is a binary variable indicating if respondent chooses the sooner-lesser amount when faced with choice of today vs. 1 month from today "Intra-household decision power v1″ is a sum of three survey responses on who makes household decisions (appliance acquisition, personal things acquisition, and family support), with two points given if answer is myself; one point if both; and zero point otherwise.

making an offer (the Appendix details the survey questions), and used the survey to screen out unpromising prospects: they were instructed by FVB management to only offer the accounts to people with regular income, and without an existing FVB savings account.[9] Marketers used personal digital assistants (PDAs) for the baseline survey and random assignment to treatments. If more than one person was present and listening to the opening appeal, marketers were instructed to interview each adult separately, and then use the final person's random assignment as the assignment for all adults in the household. 58 households opened two accounts, and six households opened three accounts.[10]

[9] In a credit marketing setting one might worry about the accuracy of baseline survey measures that were elicited by a bank employee (e.g., respondents distorting their replies to make themselves appear more creditworthy), but the savings accounts here were not subject to underwriting. The bank was interested in expanding their outreach, hence the requirement that the individual not already have a bank account with the bank.

[10] The small proportion of households with multiple accounts implies that clustering standard errors at the household level would have no material effect.

2.2. Experimental design and implementation

Marketers used PDAs to independently randomize both the interest rate and the account ownership requirement. [11]

The interest rate randomization has three arms, each assigned with 1/3 probability: (a) a normal interest rate of 1.5% APY, (b) a high interest rate of 3% APY, (c) the normal interest rate of 1.5% APY if a client does not achieve their goal, and a 3% APY if a client achieves her goal. FVB was considering offering the higher rate and the reward rate on a permanent basis, and wanted to test the impact these more generous yields would have on take-up (customer acquisition), balances, and profits. Experimental compliance, as measured by the congruity between the interest rate assigned versus actually applied to opened accounts, was strong: only 8 of 2265 have a rate that differed from their assigned rate offer.

The account ownership randomization also has three arms, each assigned with 1/3 probability in cases where the individual offered the account is married: (a) individual account only; (b) joint account only; (c) option of individual or joint account. Unmarried individuals were not randomized and offered only an individual account. Experimental compliance, as measured by the congruity between the ownership requirement assigned versus actually applied to opened accounts, was strong: only 11 of the 1523 accounts opened by married individuals or couples have ownership that is inconsistent with their assigned ownership offer.

Table 1 performs additional checks on the validity of these randomizations, and also describes some baseline characteristics of our sample.

Starting with orthogonality checks in Panel A, out of 28 tests, for only 2 covariates can we reject equality across treatment assignments (Columns 5 and 9). This frequency is about what one would expect to find by chance. Panel B reports estimates of whether the baseline survey variables jointly predict either treatment assignment, using multinomial logits. They do not. Panel C confirms that the two treatments were assigned independently: the p-value from a likelihood ratio chi-square-test of whether one treatment assignment is correlated with the other in a multinomial logit is 0.48.

2.3. Sample characteristics

As noted above with respect to the marketing filters, our sample is comprised of people with (self-reported) regular income, and without a pre-existing account with FVB. Mean (median) individual income during the last seven days is about $25 ($17). 66% of the sample owns their dwelling, and we classify 25% of the sample as relatively high wealth (defined as owning one's dwelling and having high-quality building materials).

Our sample is primarily female (67%); women tend to be the head of household with respect to financial matters in the Philippines.[12] 64% of the sample is married, and the mean age is 34 (both typical for the Philippines). 44% of the sample have attended college (the national average is 29%, per the 2008 World Development Indicators).

75% report having saved before informally (primarily at home; only 4% report informal savings group participation), and 30% report having saved before in a formal financial institution. Mean (median) reported savings at the time of the survey is about $220 ($24). 54% of individuals say they are $\geq$ "somewhat satisfied" with their current amount of savings.

18% of the sample appears present-biased in response to standard hypothetical questions designed to measure time-inconsistency (choosing smaller-sooner instead of larger-later for today versus one month from today, but then choosing larger-later for six months versus seven months from today), and 41% of the sample is "impatient" (choosing 200 pesos today instead of 250 or 300 pesos one month from today). Respondents have a moderate degree of decision power in their households, as measured by three questions about who decides: whether to make purchases of appliances and of personal things, and whether and how much to support family members financially.

3. Results

3.1. Account take-up and usage

We start by describing take-up and usage of the commitment accounts, in order to provide some context re: the non-experimental correlates of savings decisions and their stakes.

Of the 9992 offers, 23% "took-up": opened an account.[13,14] Table 2 shows conditional correlations between various measures of take-up or subsequent savings balances, and individual characteristics measured from the baseline survey. The correlations are estimated using an OLS model that includes fixed effects for marketer, the individual's neighborhood, and week-of-offer, as well as the individual variables shown in the table. Column 1 shows that take-up is significantly correlated with being female, married, more-educated, wealthier, higher-income, patient, and having more decision power and relatively high savings at baseline.[15] The marketer and week-of-offer fixed effects are also strongly correlated with take-up: they are strongly jointly significant. We see similar correlations with our other measures of bank savings (Columns 2–8).

Account openers had a mean (median) balance and high balance of 841 (102) pesos and 1252 (102) pesos, respectively, over their first 12 months. The correlation between mean balance and high balance is 0.92; such a high correlation is expected given the withdrawal restrictions. The full distribution of balances shows substantial right-skewness (Fig. 3a and b), with skewness statistics of 16.8 in the full sample and 8.8 among account-openers. This motivates concerns about the influence of outliers on OLS estimates of treatment effects. We address these by estimating treatment effects on different functional forms of savings balances.

[11] The bank reported no complaints about interest rate offers; e.g., there does not seem to have been any gossip that might have induced reference point effects or jealousy effects.

[12] Indeed, our measure of intra-household decision power shows that married women have higher mean decision power (3.9) than married men (3.3). This measure sums three survey responses regarding who makes household decisions (appliance acquisition, personal things acquisition, and family support), with two points given if answer is the respondent; one point if both; and zero points otherwise.

[13] Account openers could open more than one Gihandom account at their randomly assigned terms, and 6% of openers did open multiple accounts. Our measures of savings below span all Gihandom accounts.

[14] 92% account openers set goal terms of one year or less (Fig. 1), with 17% in the 1–3 month range, 27% in the 3–6 month range, and 48% in the 6–12 month range. 65% of account openers set the minimum goal amount of 2000 pesos ($50). Altogether 97% set goals of <10,000 (Fig. 2).

[15] Interestingly, as compared to Ashraf et al. (2006), we do not find that present-biasedness predicts take-up of the commitment savings account studied here (Table 2). We consider several potential explanations for the lack of replication. First, the questions in the Ashraf et al. (2006) study were spaced further apart, in a longer survey. In contrast, our shorter survey might generate more (artificial) time-consistency if participants recognize the similarity between the smaller-sooner vs. larger-later choices. Indeed, our subjects exhibit less time-inconsistency (18%) than Ashraf et al.'s (26%). Second, the professional surveyors in Ashraf et al. may have elicited more informative responses than the marketers here, due to differences in training and/or in respondent perceptions of how the enumerator might use the information. One way of exploring the validity of our present-bias measure is to see how it correlates with other baseline characteristics in a multivariate regression. We find that it is strongly negatively correlated with income and wealth (as expected), but not with satisfaction with current savings (surprising). Third, Ashraf et al.'s sample included only prior savers at a particular bank, whereas the product studied here was offered more broadly. This may lead to unobserved differences in the sample frame, and point to weaknesses in the external validity of the Ashraf et al. result when applied to a full population. Fourth, one of the studies may simply have generated an outlier statistically and thus be drawing the wrong inference. Fifth, differences in the product rules may lead to different selection. The product tested here was focused on motivating households to make regular savings deposits, provision of a lockbox, as well as a rule that prohibited withdrawals until both a savings amount and date were reached. In Ashraf et al. the deposits were motivated only through the provision of a similar lockbox, and the rules for withdrawal were slightly weaker: one could withdraw if they reached the goal date *or* the goal amount (rather than "and"). Despite these differences, we do not have intuitions for why such product differences would lead to a correlation between take-up and time-inconsistent preferences in one setting but not the other.

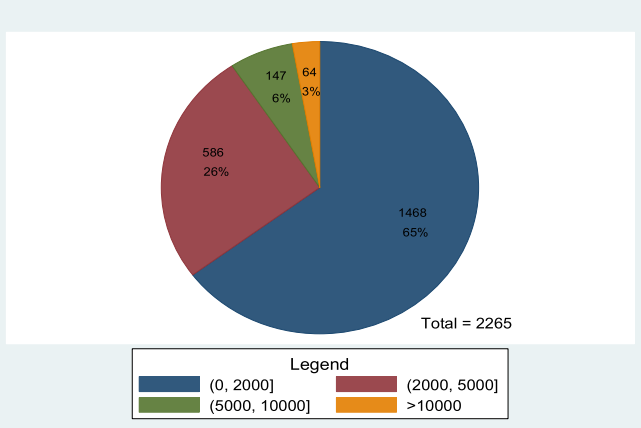

Fig. 1. Goal amount in pesos.

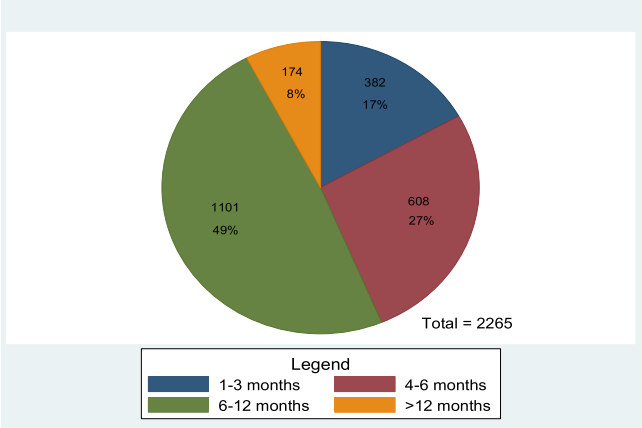

Fig. 2. Goal term in months.

Usage of accounts, for those who opened, is toward the low end of other studies of commitment savings accounts. 98% of account openers started with the only the minimum opening deposit of 100 pesos. 61% never made additional deposits after the opening deposit (suggesting perhaps that some opened the account merely to appease the direct marketer, a la (DellaVigna et al., 2012); mean and median balances of these stranded accounts is 107 and 101, respectively. Among those who made more than one deposit, the mean and median number of deposits over the entire 20-month period, March 2007–November 2008, for which we have transaction data is 5 and 4, respectively. Table 10 of Dupas et al. (2016) provides a useful point of comparison, and finds account usage, defined as >1 deposit, in the 10–20% range. We find 9.5% (10.5%) in low-interest (high-interest) group. 19% of account holders had reached their goal as of November 24, 2008, the last date for which we have balance data. The mean (median) high balance over our 20-month sample was 4391 (3000) pesos for those who reached their goal, and 669 (101) pesos for those who did not.

3.2. Price elasticities

Our estimates of price elasticities of demand for saving start with the following OLS equation on the full sample of 9992 offers:

$$Y_i = \alpha + \beta^1 \textit{High Rate}_i + \beta^2 \textit{Reward Rate}_i + \eta L_i + \delta M_i + \Phi T_i + \Gamma X_i + \varepsilon \quad (1)$$

Where Y is a measure of saving (various measures are detailed below) for individual i, and β^1 and β^2 are the coefficients of interest (with *Normal-Rate* as the omitted category). L is a vector of fixed effects for i's barangay (neighborhood), M is a vector of fixed effects for each marketer, T is a vector of fixed effects for the week in which the offer was made, X is a vector of categorical variables for amount saved at baseline,[16] and ε is the error term. We calculate Huber-White standard errors.

We then calculate point estimates and upper bounds on the price elasticity of demand using the formula:

$$\text{Elasticity} = \beta^1 / \text{mean}(Y_{\textit{Normal Rate}}) * 100/100 \quad (2)$$

Where β^1 is estimated from (1). We also report results using the upper bound of the 95% confidence interval of β^1, to estimate whether even a generous estimate implies elastic demand. We use β^1 instead of β^2 because of the conditionality of the high rate in the *Reward* treatment; in practice this assumption does not matter because we find that β^1 and β^2 generally have similar, precisely estimated null results. Scaling β^1 by the mean of the outcome in the control group, and then multiplying by 100, translates the treatment effect estimate into a percentage change in savings (or take-up). The most rightward term in (2) is 100 because the *HighRate* treatment (3%) represents a 100% increase over the normal rate (1.5%).

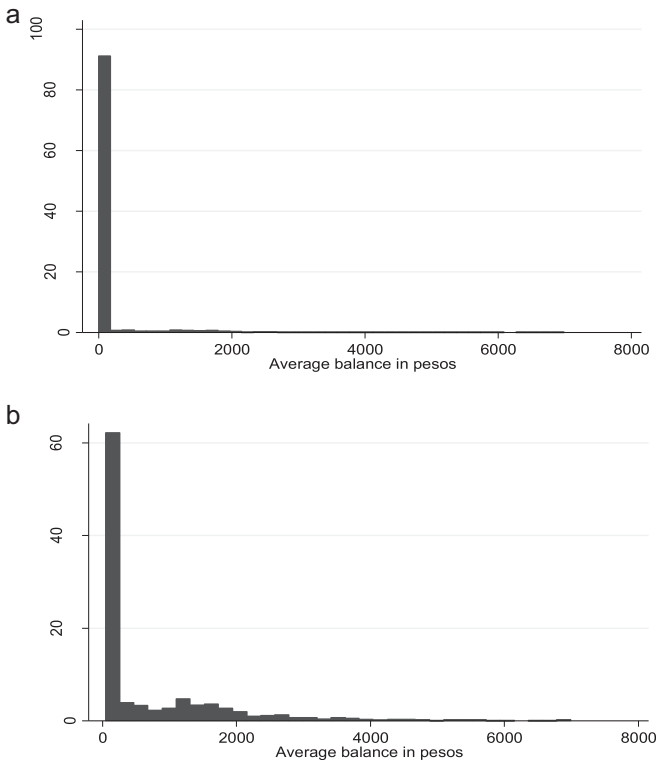

Fig. 3. a: Distribution of Average Balances Over 12 Months Post-Treatment Assignment, **b:** Distribution of Average Balances Over 12 Months Post-Treatment Assignment In Sub-sample That Opened Accounts.

We calculate nominal elasticities because real elasticities are not clearly defined in our setting: the annual inflation rate of 2.5% produces a negative real rate in the normal (base) rate group: 1.5%–2.5% = −1.0%. Saving at negative real rates is common in developing country settings, presumably due to strong self- and/or other-control motives (including security) that outweigh the often relatively large transaction costs

[16] Including additional variables from the baseline survey as controls does not change the results (unsurprisingly, given the orthogonality results in Table 1).

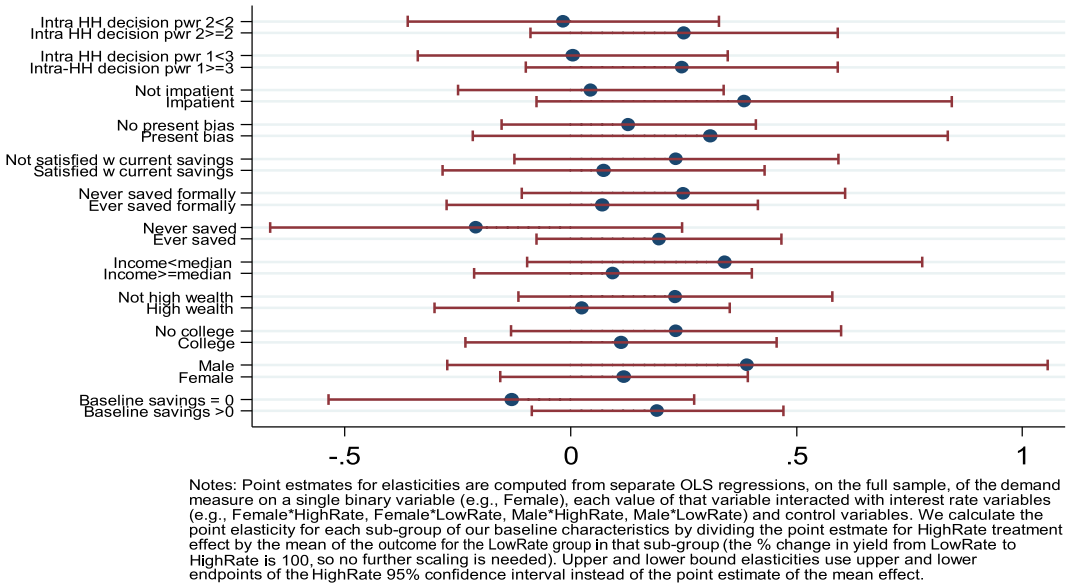

Fig. 4. Heterogeneity in Price Sensitivities Mean and Upper and Lower Bound Elasticities of Average Balances Over 12 Months Post-Treatment Assignment.

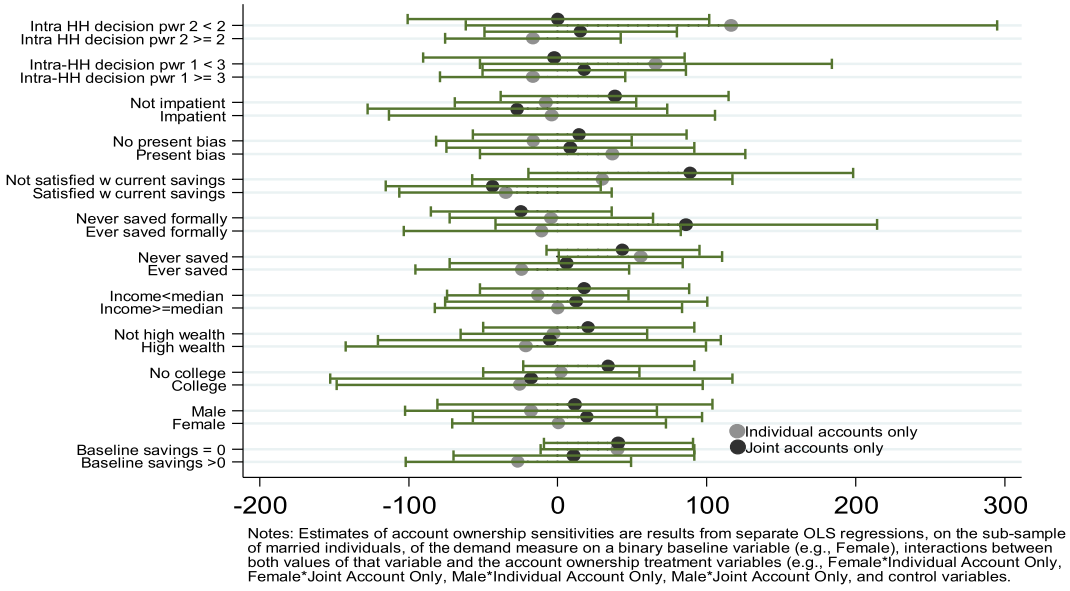

Fig. 5. Heterogeneity in Account Ownership Sensitivities of Average Balances Over 12 Months Post-Treatment Assignment.

(Karlan et al., 2014).[17] With a negative base rate the standard formula in (2) is difficult to interpret quantitatively. However, the estimated elasticity with respect to the real interest rate, rather than nominal, would be even lower, since the percent change in price is even higher as the rate approaches zero. Thus any correction for real interest rates would push even further towards our inference of zero elasticity.

Table 3 presents price sensitivity results for eight different outcome measures. Only one of sixteen estimated treatment effects is statistically significant with >90% confidence. The first outcome is take-up, which does not respond significantly to either of the higher interest rates. Column (2) sets $Y =$ (average balance over 12 months subsequent to treatment assignment) and again finds no significant effects. The point elasticity is 0.16, with an upper bound of 0.41. Column (3) winsorizes (censors) at the 95th percentile, Column (4) winsorizes at the 99th percentile, and Column (5) uses log(balances), conditioning on take-up. None of these six treatment effects are significant, and the largest upper bound elasticity is 0.22. Columns (6)–(8) find one significant effect (out of six) on three different discrete measures of saving: average 12-month balance $\geq$ 1000 pesos, reached goal, or made a deposit after the initial deposit. Appendix Tables 1–3 show similar results using a 6-month (instead of a 12-month) horizon, high balance (instead of average balance), or 12-month total deposits. Results are also similar if we restrict the sample to just those who opened an account, restrict the sample to just those who received text messaging, restrict the sample to just those who did not receive text messaging, or estimate quantile effects (results available in data and statistical file repository). To examine whether low elasticity was a by-product of poor explanation by the marketing team, we examine whether the elasticity is stronger for stronger marketers. To do this, we interact the marketer's average success rate with the interest

[17] In fact, all but one of papers cited earlier that use interest rate or price subsidies of 20 percentage points or less include interest rates that are negative, in real terms, even after the subsidy.

rate treatment. We do not find any statistically significant differential effects for stronger marketers, although the null result is not precisely estimated (results available in data and statistical file repository).

The results for the reward interest rate (β^2), while not interpretable as an elasticity, produce similarly null and precise estimates in all specifications.

In all, we find little evidence of significant price elasticities of demand for saving in the full sample. Even the largest upper bound estimate of the price elasticity implied by our confidence intervals, 0.41, indicates strictly less than elastic demand for saving in the Gihandom account.

Is the lack of price elasticity merely a symptom of overall low demand for the product, or of demand that is difficult to predict along any observable dimension? Results reported above suggest that the answer to both of these questions is "no". The overall take-up rate of 23% is comparable to take-up rates in other settings. Demand is in fact correlated strongly with consumer characteristics, and with non-price efforts undertaken by the bank (namely marketing). Thus, baseline characteristics and other observables help predict savings demand, but price does not (nor do account ownership requirements, as we see in the next sub-section).

Perhaps the lack of price sensitivity in the full sample masks substantial heterogeneity by pooling marginal savers with those for whom marginal yield variation is irrelevant? Fig. 4 presents estimates of price elasticities for sub-groups measured using baseline characteristics. We estimate separate regressions for each characteristic Z, of the form:

$$\begin{aligned} Y_i &= \alpha + \beta^3 High\ Rate_i{*}Z = 1_i + \beta^4 High\ Rate_i{*}Z \\ &= 0_i + \beta^5(\text{Re}ward\ Rate_i){*}Z = 1_i + \beta^6(\text{Re}ward\ Rate_i){*}Z = 0_i + \xi Z \\ &= 1_i + \eta L_i + \delta M_i + \Phi T_i + \Gamma X_i + \varepsilon \end{aligned} \tag{3}$$

Where Z is one of baseline savings, ever saved in formal institution, ever saved informally, relative wealth, relative income, satisfied with current savings, gender, education, present-bias, impatience, or one of two measures of intrahousehold decision power. The coefficients on the interaction terms identify sub-group point estimates that we use to calculate elasticities per Equation (2), substituting the sub-group outcome mean in the *NormalRate* group for the full sample mean. We present results only for Y = level average balances over 12 months post-treatment assignment, but results are similar for our other savings measures.

The results suggest fairly homogeneous and price-inelastic demand across sub-groups (Fig. 4). None of the 24 mean point estimates—one for each sub-group– reject zero with 90% confidence, and none of the point estimates exceeds 0.5. Only 1 upper bound estimate exceeds 1.0. Fig. 4 also shows the lack of significant differences across mutually exclusive sub-groups: there is overlap in each pair of confidence intervals among the 12 baseline characteristics.

Particularly noteworthy is the lack of significant differences between sub-groups that plausibly parse the sample into marginal vs. infra-marginal savers. And even the plausibly marginal savers– those with present bias (given that the commitment account might only appeal to those with present bias), baseline savings, prior formal or informal savings experience, higher wealth, higher income, or dissatisfaction with their baseline savings—point elasticities are uniformly <0.5 and statistically indistinguishable from zero.

Also of note is the lack of significant differences between sub-groups that may proxy for higher or lower levels of numeracy, with the idea that those with higher levels of numeracy may understand interest rates better and thus be more sensitive to them. Of course, given the range of interest rates tested, it may be that more numeracy leads to lower sensitivity, if numeracy leads individuals to infer that, given a modest expected level of savings, the value of the higher rate is too small to influence decisions.

One challenge to interpreting the sub-group treatment effects is that the sub-group classifications rely on baseline data that may be low quality, due to the survey's linkage to the account offer.[18] Although we do not see any reason to suspect that survey responses are biased differentially across study arms, we do think it is sensible to wonder whether measurement error attenuates estimates of differences between sub-groups. We cannot rule out this possibility but do think it is noteworthy that many baseline characteristics are strongly correlated with take-up and account usage (Table 2). We would not see these strong correlations between saving and the sub-group main effects if the baseline data were very noisy; e.g., if the baseline survey could not actually distinguish higher-income from lower-income respondents, we would see zeros on the income variable in Table 2.

3.3. Account ownership elasticities

Table 4 estimates the (non-)response of six outcome measures to account ownership requirements. The only difference in specification from Table 3 (and Equation (1)) is that we limit the sample here to married individuals. We do not find any significant ownership sensitivities, and the point estimates are uniformly small in magnitude. Appendix Tables 4 and 5 show similar results for the 6-month instead of the 12-month horizon, and for high-balance instead of average balance.

Fig. 5 explores heterogeneity in the impact of account ownership requirements. The analysis follows Equation (3) for interest rates, except here we present coefficients instead of elasticities (there being no natural way to define an elasticity with respect to account ownership requirements).

Overall, we find no evidence of statistically significant sensitivity to account ownership requirements. It is particularly noteworthy that we do not find any significant heterogeneity with respect to baseline decision making power in the household (top rows of Fig. 5). It may be that the illiquidity provided by the Gihandom account dampened the impact of control rights by increasing the decision power of those offered the account and/or making it easier for spouses to monitor the use (or at least withdrawal) of joint funds.

Interestingly, the lack of sensitivity to account ownership requirements comes despite a clear preference for the individual account: among those given a choice of a joint or an individual account, 89% chose individual. This preference is ultimately (quite) weak in the sense that the take-it-or-leave-it offer of "joint only" does not depress take-up or savings. Nor does having the choice seem to change the composition of who takes up, in the observable sense: Appendix Table 6 reports estimates of our take-up regressions separately for each ownership arm, and shows that correlations between observables (e.g., decision power, gender, marital status) and take-up are stable across arms.

4. Conclusion

We worked with a for-profit bank to study determinants of demand for a new commitment savings product. 10,000 door-to-door solicitations produced a 23% take-up rate. The bank randomized both the yield (within a range offered in the market) and account ownership requirement it offered, at the individual level. We find strikingly small demand sensitivities on both dimensions. Normally, to answer such questions satisfactorily researchers would need access to data on the full household portfolio, in order for example to assess whether any increase merely came from a reduction in savings held at another bank. Since the result here is a null result, that the interest rate increase did *not* lead to higher savings in the experimenting bank, there is no need for data from other banks to understand the full impact on the household portfolio. The results do not appear to be driven by liquidity constraints: we find null elasticities, and small upper bounds, even among plausibly marginal

[18] One might worry about marketers rushing respondents through the survey to focus on the marketing, and/or respondents biasing answers they incorrectly assumed might influence the bank's offer.

Table 3
Is savings demand price-sensitive? full sample estimates.

	Average Balances Over 12 Months Post-Treatment Assignment							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Take-up	Balance	Balance (censored at 95th percentile)	Balance (censored at 99th percentile)	Log (Balance)	Balance ≥ 1000 pesos	Reached goal	Opened account and made any transaction beyond opening
Mean of dependent variable	0.227	190.63	107.85	158.05	5.64	0.06	0.194	0.095
High interest rate (3%)	0.008	27.33	4.07	8.48	−0.00	0.00	−0.032	0.010
(omitted category: Regular interest rate (1.5%))	(0.010)	(22.508)	(7.430)	(12.978)	(0.071)	(0.006)	(0.020)	(0.007)
Reward interest rate	0.013	16.23	9.70	10.73	0.05	0.01	0.011	0.015*
(3% if goal reached, 1.5% if not)	(0.010)	(21.476)	(7.581)	(13.014)	(0.071)	(0.006)	(0.021)	(0.007)
Mean elasticity	0.034	0.16	0.04	0.06	0.000	0.04	−0.729	0.118
Upper bound elasticity	0.120	0.41	0.18	0.22	0.02	0.23	0.178	0.274
P-value from F-test of joint significance of baseline savings amount coefficients	0.000	0.000	0.000	0.000	0.00	0.000	0.527	0.000
P-value from F-test of joint significance of marketer coefficients	0.000	0.000	0.000	0.000	0.00	0.000	0.015	0.000
P-value from F-test of joint significance of week of offer coefficients	0.000	0.000	0.000	0.000	0.00	0.000	0.057	0.000
P-value from F-test of joint significance of neighborhood coefficients	0.000	0.55	0.071	0.37	0.000	0.34	0.000	0.004
R-squared	0.127	0.04	0.06	0.06	0.05	0.04	0.054	0.061
Observations	9992	9992	9992	9992	2265	9992	2265	9992

Notes: *p < 0.10 **p < 0.05 ***p < 0.01. Each column reports results from a single OLS regression of a demand measure on interest rate treatment variables and control variables. Robust standard errors are shown in parentheses. We calculate the point elasticity by dividing the point estmate for *HighRate* treatment effect by the mean of the outcome for the *LowRate* group (the % change in yield from *LowRate* to *HighRate* is 100, so no further scaling is needed). The upper bound elasticity uses the upper endpoint of the *HighRate* 95% confidence interval instead of the point estimate of the mean effect.

Table 4
Is demand sensitive to Account ownership requirements?.

	Average Balances Over 12 Months Post-Treatment Assignment					
	(1)	(2)	(3)	(4)	(5)	(6)
	Take-up	Balance	Balance (censored at 95th percentile)	Balance (censored at 99th percentile)	Balance ≥ 1000 pesos	Made more than one deposit
Mean of dependent variable	0.238	207.95	114.82	170.91	0.07	0.102
Individual accounts only	−0.003	−6.59	3.47	−3.01	−0.00	0.015
(omitted category: choice of individual or joint account)	(0.012)	(28.809)	(9.543)	(16.498)	(0.007)	(0.009)
Joint accounts only	−0.013	14.11	3.04	10.61	0.00	0.009
	(0.012)	(30.854)	(9.547)	(17.247)	(0.007)	(0.009)
P-value from F-test of joint significance of baseline savings amount coefficients	0.000	0.000	0.000	0.000	0.000	0.000
P-value from F-test of joint significance of marketer coefficients	0.000	0.000	0.000	0.000	0.000	0.000
P-value from F-test of joint significance of week of offer coefficients	0.000	0.00	0.000	0.000	0.000	0.000
P-value from F-test of joint significance of neighborhood coefficients	0.000	0.28	0.03	0.21	0.06	0.007
R-squared	0.152	0.05	0.08	0.07	0.05	0.072
Observations	6396	6396	6396	6396	6396	6396

Notes: *p < 0.10 **p < 0.05 ***p < 0.01. Each column reports results from a single OLS regression of the demand measure on account ownership treatment variables. Sample size is lower than in interest rate tables, because account ownership requirements are only relevant for married individuals, and hence we restrict the sample here to married individuals only. Robust standard errors are shown in parentheses.

savers (e.g. those with savings at baseline, prior savings experience, relatively high wealth or income, present-bias).

The external validity of our results is of course uncertain, highlighting the value of replication with other products and in other settings. Businesses, not merely researchers, have incentives to replicate and understand optimal pricing in their markets. A few dimensions are particularly noteworthy. First, these are short-term savings accounts, as most of the goals are for less than a year. The nominal amount of differential interest earned between the high and low interest rates is fairly small, particularly compared to long-term settings such as retirement with more compounding and years to accumulate the differential interest.

If not price, what may matter? First, price may still matter in a different context, with a different magnitude. Several studies have found that matching, for example, does lead to higher savings (Duflo et al.,

2006), although matching is typically outside of market interest rates. Transaction fees, trust, convenience, proximity, and safety may all be critical drivers more important than a mere one or two percentage point shift in interest rates for savings of under a year.

But replication alone may not suffice to interpret and apply the range of intertemporal price sensitivities found in various studies. Why, for example, does microcredit demand respond nontrivially, and even quite strongly, to marginal variation in interest rates (Karlan and Zinman, 2008, 2016), while microsavings demand does not (at least in the current study)? And why do other studies find strong sensitivity to savings account-opening fees (Cole et al., 2011; Dupas and Robinson, 2013a; Prina, 2015)? Nonlinearities may be important, and future studies would do well to identify more complete pictures of demand curves.[19]

Acknowledgements

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Appendix 1. Baseline Survey Questions

Basic Information	
(1) Sex of respondent	(a) Male (b) Female
(2) Civil status	(a) Single (b) Married (c) Separated (d) Widowed
(3) How old were you at your last birthday?	Specify number of years
(4) What is the highest grade you obtained?	(a) No schooling (b) Some elementary (c) Elementary graduate (d) Some high school (e) High school graduate (f) Some college (g) Completed college
(5) What is your primary occupation?	(a) Government official (b) Professional or technical (non-production) (c) Administrative or clerical (d) Sari-sari store owner (e) Tricycle, jeepney, taxi, or other transport (f) Farmers, fisherman, hunters, loggers and related workers (g) Miners, quarrymen and related workers (h) Craftsman or production-process (i) Plant and machine operators and assemblers (j) Wage laborers (k) Entrepreneur Service (l) Microentrepreneur Service (m) Retired personnel (government and private organizations) (n) Houseworker (without wage) and unemployed student
(6) What was your own total income in the past seven days?	Specify number of pesos
(7) What is the source of your drinking water?	(a) Bottled water (b) Community water system (piped) - own use (c) Community water system (piped) - shared with other households (d) Deep/artesian well, own use (e) Deep/artesian well, shared with other households (f) River, stream, lake, or spring water
(8) What is the ownership status of your residence?	(a) Own house and lot (b) Rent house/room and lot (c) Own house and rent lot (d) Rent-free house/room and lot (e) Own house and rent-free lot; (f) Other (specify)
Household Wealth Indicators (answered by marketer based on his or her observation)	
(9) Construction materials used on the wall	(a) Strong materials (concrete, brick, stone, wood, galvanized iron, asbestos): 1 point (b) Light materials (bamboo, sawali, cogon, nipa): 2 points (c) Salvaged and makeshift materials: 3 points (d) Mixed but predominantly strong materials: 4 points (e) Mixed but predominantly light materials: 5 points (f) Mixed but predominantly salvaged materials: 6 points

(*continued on next page*)

[19] See, e.g., Karlan and Zinman (2008) on credit, and Kremer and Holla (2009) on education and health.

(*continued*)

(10) Construction materials used on the roof	(a) Strong materials (concrete, brick, stone, wood, galvanized iron, asbestos): 1 point (b) Light materials (bamboo, sawali, cogon, nipa): 2 points (c) Salvaged and makeshift materials: 3 points (d) Mixed but predominantly strong materials: 4 points (e) Mixed but predominantly light materials: 5 points (f) Mixed but predominantly salvaged materials: 6 points
(11) Construction materials used on the floor	(a) Strong materials (concrete, brick, stone, wood, galvanized iron, asbestos): 1 point (b) Light materials (bamboo, sawali, cogon, nipa): 2 points (c) Salvaged and makeshift materials: 3 points (d) Mixed but predominantly strong materials: 4 points (e) Mixed but predominantly light materials: 5 points (f) Mixed but predominantly salvaged materials: 6 points
Time Discounting I: Following hypothetical situation was presented: *"Suppose you win the barangay raffle today. The lottery administrator gives you options for how you would like to accept your cash prize. One option will be to accept your cash prize today; the other option would be to accept a larger cash prize, but with a one month delay. You will be asked to pick the option you prefer. Please make your decisions based on how you expect you would answer if the choice were actual and not hypothetical."*	
(12) Do you prefer a 200 pesos prize guaranteed today or a 250 pesos prize guaranteed 1 month from now?	(a) 200 pesos today (b) 250 pesos in 1 month
(13) Would you prefer to receive 200 pesos guaranteed today, or 300 pesos guaranteed in 1 month?	(a) 200 pesos today (b) 300 pesos in 1 month
(14) If answer is (a) to both Questions (12) and (13), how much would the prize have to be for you to choose to wait?	Specify number of pesos
Savings Habit	
(15) Have you ever saved at home or at any (in)formal institution regularly before?	(a) Yes (b) No
(16) Where have you saved your money?	(a) Formal financial institution (b) Informal financial institution/ROSCAs (c) At home (d) Other (specify)
(17) Were you able to save as much as you wanted?	(a) Yes (b) No
(18) If not, why?	(a) Income went down (b) Family/relatives asked for my money (c) I spent before I saved (d) There was unexpected expenditures (e) Other (specify)
(19) How much savings do you have?	Specify number of pesos
(20) Are you satisfied with your current amount of savings?	(a) Very satisfied (b) Somewhat satisfied (c) Somewhat unsatisfied (d) Very unsatisfied
(21) Do you agree with the following statement: *"I often find that I regret spending money. I wish that when I had cash, I was better disciplined and saved it rather than spent it."*	(a) Strongly agree (b) Somewhat agree (c) Feel neutral (d) Somewhat disagree (e) Strongly disagree
Household Decision Making	
(22) In your household, who decides when and what expensive things to buy for the household such as radio and TV?	(a) Myself (b) Spouse (c) Both
(23) During quarrels or conflicts, who initiates reconciliation first?	(a) Myself (b) Spouse (c) Both
(24) Who decides when and what to give as assistance and support to parents, in-laws, siblings?	(a) Myself (b) Spouse (c) Both
(25) Who decides what items to buy for your personal use (e.g. clothing, etc.)?	(a) Myself (b) Spouse (c) Both
Time Discounting II	
Following hypothetical situation was presented: *"Now the option will be to accept the raffle cash prize six months from now, or to accept a larger cash prize seven months from now. Please make your decisions based on how you expect you would answer if the choice were actual and not hypothetical."*	
(26) Do you prefer a 200 pesos prize guaranteed 6 months or a 250 pesos prize guaranteed 7 months from now?	(a) 200 pesos in 6 months (b) 250 pesos in 7 months
(27) Would you prefer to receive 200 pesos guaranteed in 6 months, or 300 pesos guaranteed in 7 months?	(a) 200 pesos in 6 months (b) 300 pesos in 7 months
(28) If answer is (a) to both Questions 26 and 27, how much would the prize have to be for you to choose to wait for 7 months?	Specify number of pesos

Appendix Table 1
Is Savings Demand Price-Sensitive? Full Sample Estimates for 6-Months Instead of 12 Months

	Average Balances Over 6 Months Post-Treatment Assignment			
	(1)	(2)	(3)	(4)
	Balance	Balance (censored at 95th percentile)	Balance (censored at 99th percentile)	Balance ≥ 1000 pesos
Mean of dependent variable	201.49	117.32	167.96	0.06
High interest rate (3%) (omitted category:	38.08	5.20	13.39	0.00
Regular interest rate (1.5%))	(23.911)	(8.204)	(13.889)	(0.006)
Reward interest rate	19.38	10.50	12.52	0.01
(3% if goal reached, 1.5% if not)	(22.002)	(8.362)	(13.789)	(0.006)
Mean elasticity	0.21	0.05	0.08	0.05
Upper bound elasticity	0.47	0.19	0.25	0.23
P-value from F-test of joint significance of baseline savings amount coefficients	0.000	0.000	0.000	0.000
P-value from F-test of joint significance of marketer coefficients	0.000	0.000	0.000	0.000
P-value from F-test of joint significance of week of offer coefficients	0.000	0.000	0.000	0.000
P-value from F-test of joint significance of neighborhood coefficients	0.59	0.09	0.35	0.32
R-squared	0.04	0.06	0.06	0.04
Observations	9992	9992	9992	9992

Notes: *p < 0.10 **p < 0.05 ***p < 0.01. Each column reports results from a single OLS regression of a demand measure on interest rate treatment variables and control variables. Robust standard errors are shown in parentheses. We calculate the point elasticity by dividing the point estmate for *HighRate* treatment effect by the mean of the outcome for the *LowRate* group (the % change in yield from *LowRate* to *HighRate* is 100, so no further scaling is needed). The upper bound elasticity uses the upper endpoint of the *HighRate* 95% confidence interval instead of the point estimate of the mean effect.

Appendix Table 2
Is Savings Demand Price-Sensitive? Full Sample Estimates for High Balance Instead of Average Balance

	High Balances Over 12 Months Post-Treatment Assignment			
	(1)	(2)	(3)	(4)
	Balance	Balance (censored at 95th percentile)	Balance (censored at 99th percentile)	Balance ≥ 1000 pesos
Mean of dependent variable	283.87	158.78	231.68	0.07
High interest rate (3%) (omitted category:	44.31	6.85	13.78	0.00
Regular interest rate (1.5%))	(33.285)	(11.715)	(19.782)	(0.006)
Reward interest rate (3% if goal reached,	31.82	15.92	23.41	0.01
1.5% if not)	(31.445)	(11.976)	(19.984)	(0.006)
Mean elasticity	0.17	0.04	0.06	0.04
Upper bound elasticity	0.42	0.20	0.24	0.21
P-value from F-test of joint significance of baseline savings amount coefficients	0.000	0.000	0.000	0.000
P-value from F-test of joint significance of marketer coefficients	0.000	0.000	0.000	0.000
P-value from F-test of joint significance of week of offer coefficients	0.000	0.000	0.000	0.000
P-value from F-test of joint significance of neighborhood coefficients	0.68	0.17	0.64	0.36
R-squared	0.04	0.06	0.05	0.046
Observations	9992	9992	9992	9992

Notes: *p < 0.10 **p < 0.05 ***p < 0.01. Each column reports results from a single OLS regression of a demand measure on interest rate treatment variables and control variables. Robust standard errors are shown in parentheses. We calculate the point elasticity by dividing the point estmate for *HighRate* treatment effect by the mean of the outcome for the *LowRate* group (the % change in yield from *LowRate* to *HighRate* is 100, so no further scaling is needed). The upper bound elasticity uses the upper endpoint of the *HighRate* 95% confidence interval instead of the point estimate of the mean effect.

Appendix Table 3
Is Savings Demand Price-Sensitive? Full Sample Estimates for Total Amounts Deposited Instead of Average Balance

	Total Deposits Over 12 Months Post-Treatment Assignment				
	(1)	(2)	(3)	(4)	(5)
	Total Amounts Deposited	Total Amounts Deposited (censored at 95th percentile)	Total Amounts Deposited (censored at 99th percentile)	Total Amounts Deposited ≥ 1000 pesos	log(Total Amounts Deposited)
Mean of dependent variable	310.798	161.757	256.057	0.070	5.829
High interest rate (3%)	41.423	6.599	9.943	0.002	−0.004
(omitted category: Regular interest rate (1.5%))	(35.969)	(11.831)	(22.473)	(0.006)	(0.082)
Reward interest rate (3% if goal reached, 1.5% if not)	44.343	17.663	26.999	0.008	0.085
	(35.088)	(12.128)	(22.892)	(0.006)	(0.083)
Mean elasticity	0.147	0.043	0.041	0.032	−0.001
Upper bound elasticity	0.397	0.194	0.221	0.209	0.027
P-value from F-test of joint significance of baseline savings amount coefficients	0.000	0.000	0.000	0.000	0.002
P-value from F-test of joint significance of marketer coefficients	0.000	0.000	0.000	0.000	0.001
P-value from F-test of joint significance of week of offer coefficients	0.000	0.000	0.000	0.000	0.015
P-value from F-test of joint significance of neighborhood coefficients	0.621	0.163	0.517	0.355	0.000
R-squared	0.042	0.061	0.056	0.048	0.052
Observations	9992	9992	9992	9992	2265

Notes: *p < 0.10 **p < 0.05 ***p < 0.01. Each column reports results from a single OLS regression of a demand measure on interest rate treatment variables and control variables. Robust standard errors are shown in parentheses. Amounts deposited measured over 12 months post-random assignments. We calculate the point elasticity by dividing the point estmate for *HighRate* treatment effect by the mean of the outcome for the *LowRate* group (the % change in yield from *LowRate* to *HighRate* is 100, so no further scaling is needed). The upper bound elasticity uses the upper endpoint of the *HighRate* 95% confidence interval instead of the point estimate of the mean effect.

Appendix Table 4
Is Savings Demand Sensitive to Account Ownership Requirements? Married-Sample Estimates for 6 Months Instead of 12 Months

	Average Balances Over 6 Months Post-Treatment Assignment			
	(1)	(2)	(3)	(4)
	Balance	Balance (censored at 95th percentile)	Balance (censored at 99th percentile)	Balance ≥ 1000 pesos
Mean of dependent variable	220.76	124.95	181.68	0.07
Individual accounts only	−13.86	2.94	−5.07	−0.00
(omitted category: choice of individual or joint account)	(31.073)	(10.533)	(17.648)	(0.008)
Joint accounts only	8.33	3.26	9.54	0.00
	(32.791)	(10.574)	(18.415)	(0.008)
P-value from F-test of joint significance of baseline savings amount coefficients	0.000	0.000	0.000	0.000
P-value from F-test of joint significance of marketer coefficients	0.000	0.000	0.000	0.000
P-value from F-test of joint significance of week of offer coefficients	0.01	0.000	0.000	0.000
P-value from F-test of joint significance of neighborhood coefficients	0.47	0.05	0.31	0.06
R-squared	0.05	0.07	0.07	0.05
Observations	6396	6396	6396	6396

Notes: *p < 0.10 **p < 0.05 ***p < 0.01. Each column reports results from a single OLS regression of a demand measure on account ownership treatment variables. Sample size is lower than in interest rate tables, because account ownership requirements are only relevant for married individuals, and hence we restrict the sample here to married individuals only. Robust standard errors are shown in parentheses.

Appendix Table 5
Is Savings Demand Sensitive to Account Ownership Requirements? Married-Sample Estimates for High Balance Instead of Average Balance

	High Balances Over 12 Months Post-Treatment Assignment			
	(1)	(2)	(3)	(4)
	Balance	Balance (censored at 95th percentile)	Balance (censored at 99th percentile)	Balance ≥ 1000 pesos
Mean of dependent variable	309.11	169.35	248.16	0.07
Individual accounts only	−13.28	8.86	3.21	0.00
(omitted category: choice of individual or joint account)	(42.888)	(15.143)	(25.245)	(0.008)
Joint accounts only	25.99	7.50	17.40	0.00
	(45.963)	(15.060)	(25.812)	(0.008)
P-value from F-test of joint significance of baseline savings amount coefficients	0.000	0.000	0.000	0.000
P-value from F-test of joint significance of marketer coefficients	0.000	0.000	0.000	0.000
P-value from F-test of joint significance of week of offer coefficients	0.01	0.00	0.000	0.000
P-value from F-test of joint significance of neighborhood coefficients	0.58	0.07	0.48	0.16
R-squared	0.05	0.07	0.06	0.05
Observations	6396	6396	6396	6396

Notes: *p < 0.10 **p < 0.05 ***p < 0.01. Each column reports results from a single OLS regression of a demand measure on account ownership treatment variables. Sample size is lower than in interest rate tables, because account ownership requirements are only relevant for married individuals, and hence we restrict the sample here to married individuals only. Robust standard errors are shown in parentheses.

Appendix Table 6
Take-up Regressions by Each Account Ownership Requirement

	Take-up		
	Individual Accounts Only	Joint Accounts Only	Choice of Individual or Joint Account
	(1)	(2)	(3)
Female	0.125***	0.099***	0.118***
	(0.014)	(0.014)	(0.014)
Married	−0.087**	−0.066*	−0.066*
	(0.030)	(0.029)	(0.028)
Education ≥ some college	0.061***	0.039*	0.051**
	(0.016)	(0.015)	(0.015)
High wealth (owns home with high quality materials)	0.036	0.045*	0.039*
	(0.019)	(0.019)	(0.018)
Income ≥ median (in-sample)	0.103***	0.078***	0.069***
	(0.016)	(0.016)	(0.015)
Ever saved at home or (in)formal institutions	−0.014	0.004	0.060
	(0.066)	(0.069)	(0.059)
Ever saved formally	−0.027	−0.016	−0.032
	(0.021)	(0.021)	(0.021)
Baseline savings amount - zero amount	Omitted	Omitted	Omitted
Baseline savings amount - quintile 1	0.073	−0.013	−0.011
	(0.068)	(0.069)	(0.062)
Baseline savings amount - quintile 2	0.123	0.043	0.023
	(0.068)	(0.070)	(0.061)
Baseline savings amount - quintile 3	0.121	0.054	0.068
	(0.067)	(0.070)	(0.061)
Baseline savings amount - quintile 4	0.105	0.093	0.077
	(0.068)	(0.070)	(0.062)
Baseline savings amount - quintile 5	0.197**	0.110	0.148*
	(0.070)	(0.072)	(0.065)
Baseline savings amount - missing values	0.131	0.066	0.043
	(0.087)	(0.083)	(0.080)
Satisfied with current savings	−0.009	−0.011	−0.019
	(0.017)	(0.016)	(0.016)
Present-bias	0.003	−0.013	0.001
	(0.023)	(0.021)	(0.022)
Impatient	−0.062***	−0.065***	−0.058***
	(0.018)	(0.017)	(0.017)
Intra-household decision power v1 (range is 0–6)	0.017*	0.023***	0.020**
	(0.007)	(0.007)	(0.007)

(*continued on next page*)

Appendix Table 6 (*continued*)

	Take-up		
	Individual Accounts Only	Joint Accounts Only	Choice of Individual or Joint Account
	(1)	(2)	(3)
P-value from F-test of joint significance of baseline savings amount coefficients	0.011	0.005	0.001
P-value from F-test of joint significance of marketer	0.000	0.000	0.000
P-value from F-test of joint significance of week of offer coefficients	0.000	0.000	0.000
P-value from F-test of joint significance of neighborhood coefficients	0.030	0.000	0.000
Mean of dependent variable	0.242	0.211	0.228
R-squared	0.178	0.185	0.163
Observations	3275	3283	3434

Notes: *p < 0.10 **p < 0.05 ***p < 0.01. Each column reports results from OLS regression of a demand measure on the baseline variables shown or summarized in the rows. Robust standard errors are shown in parentheses. Present-bias is a binary variable indicating whether respondent is less patient, in hypothetical sooner-lesser vs. larger-later choices, when making a choice between today or 1 month from today than when making a choice between 6 months from today or 7 months from today. Impatient is a binary variable indicating if respondent chooses the sooner-lesser amount when faced with choice of today vs. 1 month from today. "Intra-household decision power v1″ is a sum of three survey responses on who makes household decisions (appliance acquisition, personal things acquisition, and family support), with two points given if answer is myself; one point if both; and zero point otherwise.

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