

# When the message hurts: The unintended impacts of nudges on saving

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# Motivation

- Financial inclusion is a concern of governments, international organizations, and commercial institutions alike.
- On a macro level, financial sector development
  - stimulates economic growth (Jayaratne and Strahan, 1996; Black and Strahan, 2002; Levine, 2005) and
  - reduces income inequality (Beck et al., 2007).
- On a micro level, financial access is critical for
  - poverty alleviation (Burgess and Pande, 2005; Honohan, 2004), and
  - economic welfare (Allen et al., 2016), particularly in low and middle-income countries (World Bank, 2014).



## Motivation (cont'd)

- Interventions aiming to promote financial inclusion often focus explicitly on savings, noting its role in mitigating shocks and facilitating investment.
  - Evaluations of these interventions, however, show mixed results (Steinert et al., 2018 and Duvendack and Mader, 2020).
- In low-income settings
  - commitment savings products that incentivize deposits and restrict withdrawals have been shown to increase savings (Ashraf et al. , 2006; ; Karlan et al., 2016; Kast et al., 2018; Roll et al., 2020)
  - while expanding access to basic, low-interest accounts has limited impact (Aron, 2018; Assuncao, 2013; Dupas et al., 2018)
- In high-income settings
  - the results are more mixed and suggest that informational nudges may sometimes discourage saving (Beshears et al., 2015)



## Motivation (cont'd)

- Often, these interventions include informational nudges, like messaging, and commitment devices, such as goal setting, that are intended to incentivize saving.
- Recent experiments in low-income settings have shown a positive impact of messaging and goals on savings, where messaging takes different forms, from general reminders about one's goal to peer information.
  - Karlan et al. (2016) test the impact of gains versus loss framing on reminders that mention both savings goals and financial incentives.
  - Kast et al. (2018) test the impact of messages that include peer pressure to achieve stated savings goals versus information about the savings behaviors of peers.



# Literature

- General reminders are thought to increase savings by addressing limited attention and promoting salience (Karlan et al., 2016)
  - While there are several theoretical reasons why peer information should also encourage savings (Breza and Chandrasekhar, 2019), in higher-income settings peer information has been shown to discourage saving (Beshears et al., 2015).
- Goal setting theoretically helps to overcome self-control problems and is a standard feature in most interventions aiming to promote saving,
  - goal setting can sometimes interact with nudges in discouraging ways.
    - messaging may reduce saving among people whose goals are inconsistent with their peers (Beshears et al., 2015 and Schultz et al. 2007)
    - peer information leads to a "boomerang effect" (Clee and Wicklund, 1980), such as oppositional reactions or negative belief updating,
  - General reminders may also unintentionally decrease saving among those who set unrealistic goals by increasing the salience of said goals (Harding and Hsiaw, 2014)



# This paper

- We design a randomized intervention to elucidate whether informational nudges, including general reminders and peer information, help or hinder saving in an upper-middle income setting.
- We design our intervention to test whether certain types of messaging - general reminders versus peer information - have a differential impact on saving, and further, whether these messages interact with goal setting in unintended ways.
- We implement our experimental intervention among a random sample of farmers in Romania,
  - Romania is classified by the World Bank as an upper-middle income country, with a per capita GDP of \$12,400 USD in 2018 at the time of our experiment.
  - Financial inclusion levels in Romania are some of the lowest in Europe and Central Asia, where just 14 percent of adults formally save.



# This paper – What we do

- Over 500 farmers were randomly selected to participate in our experiment.
  - We focus explicitly on farmers, as they represent almost a quarter of the labor force and a significant portion of the unbanked in Romania.
- Each participant was presented with an offer to join our experimental home-savings bank and informed that after three months, the research team would revisit to observe the total accumulated savings and pay 1 percent interest on the balance.
- At baseline, all participants were asked whether they would like to set a savings goal and if so, how much they wished to save over the following months.
- In addition, participants were randomized into three groups.
  - In the first group, participants received a general text message reminder to save.
  - In a second group, participants received the general reminder and were also informed of the average savings goals of their peers.
  - In a third, control group, participants received no text messages.



## This paper – What we do

- We then estimate the impact of messaging on savings.
  - First, we examine the effect of receiving any messages - reminders or peer information
  - Second, we estimate the separate effect of reminders versus peer information and find that while both types of messaging appear to reduce the propensity to save, the difference is neither statistically significantly different from the control group nor between the two treatment groups.
- Next, we examine heterogeneity by whether the participant set a savings goal.
- As a final exercise, we examine how our randomized messages interact with important behavioral and institutional factors that are known to influence savings, including present bias, trust in financial institutions, and geographic proximity to banks.





# This paper – What we find

- We find that on average, 17 percent of participants saved in the experimental account, accumulating 488 Lei (\$122 USD) over the three-month period.<sup>11</sup>
  - Relative to low baseline financial engagement, in which 27 percent of participants reported owning a formal savings account with an average balance of 700 Lei (\$175 USD), the engagement with the experimental account is qualitatively meaningful.
- The impact of messaging on savings.
  - the effect of receiving any messages (reminders or peer information) on the propensity to save → no significant difference between treatment and control.
  - the separate effect of reminders versus peer information → the difference is neither statistically significantly different from the control group nor between the two treatment groups.



# This paper – What we find

- Heterogeneity by whether the participant set a savings goal.
  - In the control group with no messaging, those who set a goal were 15 percentage points more likely to save in the experimental account and saved 125 percent more on average than those who did not set a goal.
  - However, in the treatment group, any messaging ( reminder or peer) reduced the propensity to save for those who set a goal by 21 percentage points.
- Messaging negatively interacts with goal setting in our sample
  - Compare those who set high goals (i.e., above the mean savings goals of their peers) with those who set low or no goals.
  - We find that for people who set high goals, messaging reduces the propensity to save by 23 percentage points.
  - Furthermore, general reminders and peer information have a statistically equivalent impact on reducing savings among high goal setters.



# Experimental design

- We conducted our experiment over five months, from November 2017 to March 2018, among a random sample of farmers living in a rural county in northeast Romania.
- We focus specifically on farmers for several reasons.
  - First, agriculture is one of the primary sectors in the Romanian economy, with over 23 percent of the labor force employed in agricultural activities - the highest in all of Europe (Eurostat, 2017).
  - Second, farmers represent a significant portion of the unbanked in Romania; in our sample, only 27 percent of farmers had a formal savings account at baseline, compared to 58 percent in the national average, and of those who had an account, only 20 percent made deposits on a regular basis.
- To construct our experimental sample, we implemented a stratified random sampling design from a list of farmers who were enrolled in a European Union program to support rural agriculture.
  - First, we selected a random sample of localities (27) to ensure balance across particular geographic and historical factors.
  - Within each locality, we then randomly selected 20 farmers to invite to the experiment, for a total target of 540 participants.



# Experimental design

- Our experimental design consisted of several components.
  - First, we administered a baseline survey to each of the selected participants privately in their homes to collect information on basic demographic characteristics, risk and time preferences, engagement with various financial services, farm attributes, and trust in financial institutions.
  - At the end of the survey, all participants were presented with an offer to join our experimental savings bank and given a small box to deposit their savings into over the period of the study.
    - The enumerator informed the participant that our team would return in three months to conduct a follow-up interview and pay one percent interest on the total savings accumulated in their experimental account.
  - At the time the savings boxes were administered, participants were also asked whether they would like to set a savings goal for their experimental account, and if so, how much they wished to save.



# Experimental design

- Within in each locality, participants were randomized into one of three treatment groups prior to the baseline survey visit.
  - Participants in the *control group* received only the savings box.
  - In a second group (*the reminder treatment*), participants received the savings box and were also sent one text message after eight weeks to remind them to save.
  - In a third group (*the peer treatment*), participants received the box and text message reminder, but in addition to being reminded to save, they also received information about the average savings goal of all participants in the study.
- At the time the savings boxes were administered, participants were given no information regarding the messaging treatments.



# Experimental design

- We designed the experimental account as a savings box to be kept at home for several reasons.
  - First, given the rural nature of our experimental setting, simply offering participants the option to open an account with an existing bank is not feasible.
    - 70 percent of participants do not have a bank in their village and would have to travel on average more than five km to the nearest village to access a physical bank.
  - Second, financial under-development presents a logistical barrier to saving that we overcome by bringing the experimental bank directly to participants, ensuring that the transaction costs of saving are equal for all subjects.
  - Third, many banks have account opening fees and minimum deposit requirements, which have been shown to reduce savings in other contexts and prevent the poor from opening bank accounts (Dupas and Robinson, 2013).
    - Our experimental bank eliminates these barriers to entry to isolate the direct effect of messaging, and its interaction with goal setting, on saving.



# Experimental design

- We hired a local survey company to administer the baseline and follow-up surveys, conduct the time and risk elicitation tasks, send the text message reminders, and count and pay interest on the savings at the end of the experimental period.
- Baseline surveys were administered in late November and early December 2017, just after the harvest and at a time when farmers had been recently paid for their crop yields.
- Follow-up surveys and interest payments were completed in early March 2018.



# Summary statistics

- Of the 540 randomly selected farmers who were invited to the experiment, 503 participated in the baseline survey and were given savings boxes.
- Of the 503 baseline participants, 412 completed the follow-up and presented their experimental savings accounts for interest payments.
  - The attrition was balanced on almost every dimension, with the exception that people who had a formal savings account at baseline and who reported a higher total balance in that account were less likely to complete the follow-up.
  - Attrition does not vary with assignment to treatment or control.
- Of the farmers who completed the follow-up, 17 percent saved in the experimental account, accumulating 488 Lei (\$122 USD) on average over the three-month period.
  - only 27 percent of the sample reported saving in a formal account at baseline.
  - of those who had a formal account, the average account balance at the time of the baseline survey was 700 Lei (\$175 USD).





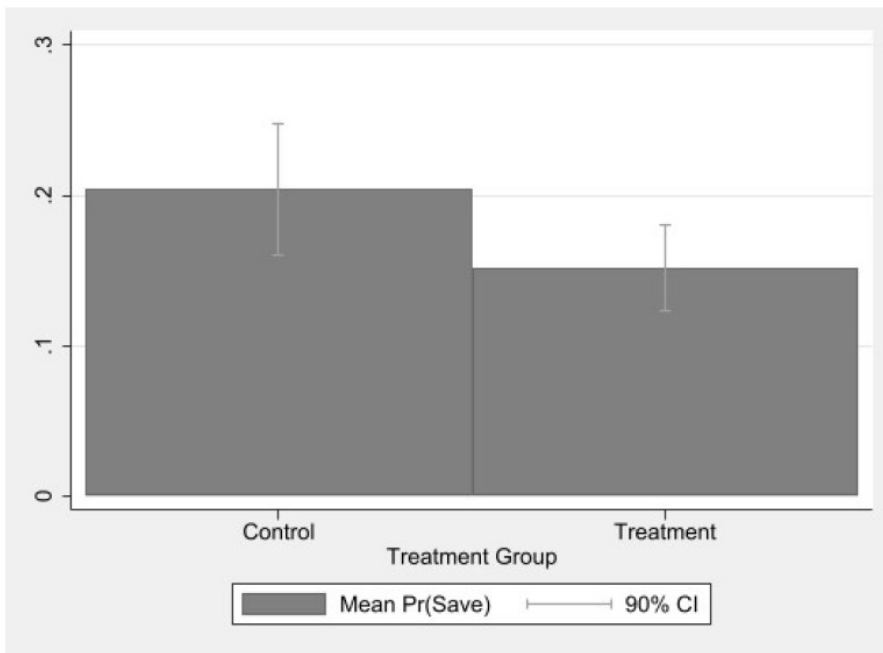
# Summary statistics

	Treatment		Control		Difference
	N	Mean	N	Mean	P-value
Age	330	51.27	167	53.00	0.157
Female	334	0.21	169	0.23	0.587
Post-secondary school	334	0.39	169	0.36	0.582
Household size	333	3.96	169	3.78	0.273
Children in household	333	0.68	169	0.78	0.284
Adults in household	333	2.74	169	2.55	0.163
Work off farm	326	0.31	168	0.27	0.408
Farm size (Ha)	334	11.53	167	12.08	0.766
Farm equip	334	2.39	169	2.14	0.376
Migrant	334	0.21	169	0.20	0.766
Durables	334	6.59	169	6.56	0.875
$\sigma$ risk choice	334	2.71	168	2.72	0.990
Discount rate	334	94.94	169	95.11	0.365
Present bias	334	0.06	169	0.05	0.764
Set savings goal	334	0.31	169	0.27	0.441
High savings goal	334	0.26	169	0.24	0.612
Formal savings account	332	0.25	169	0.30	0.217
Formal savings (Lei)	328	169.28	168	214.14	0.199
Informal savings (Lei)	321	282.40	164	269.36	0.741
No bank in village	334	0.69	169	0.70	0.774

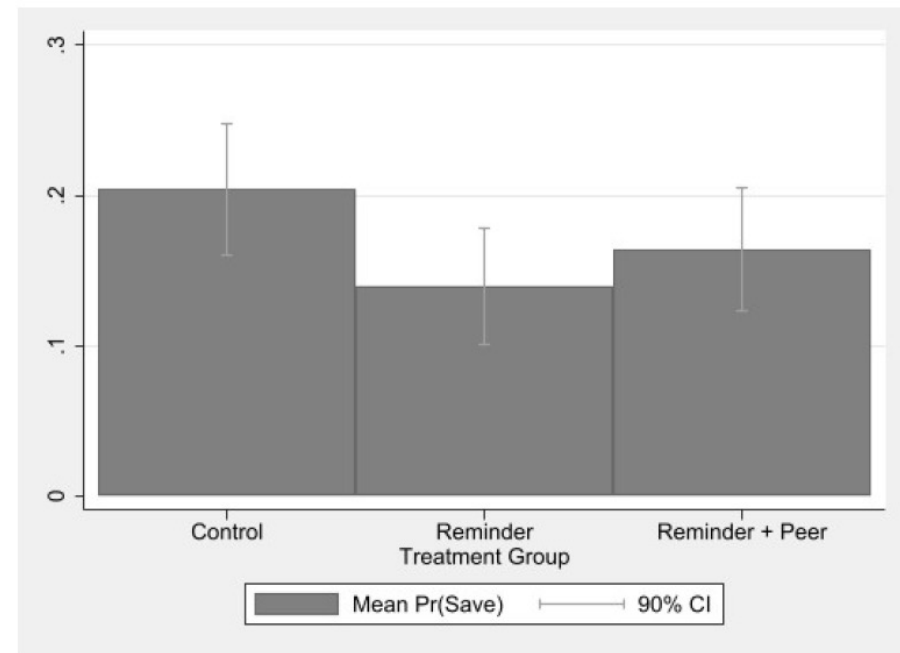


# Summary statistics

Figure 1: Experimental savings and reminders



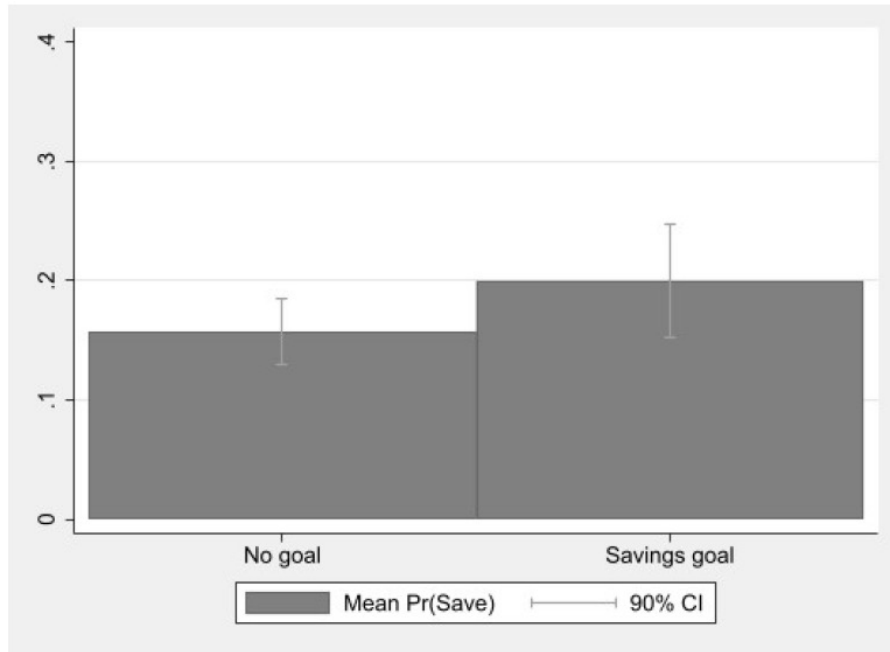
(a) Any reminder



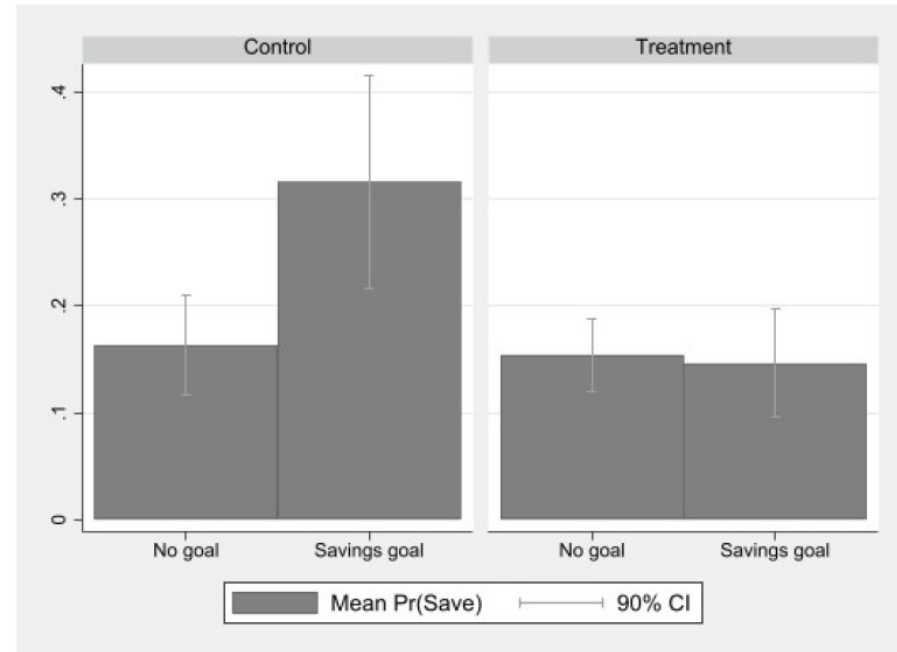
(b) Specific reminders

# Summary statistics

Figure 2: Experimental savings, goals, and reminders



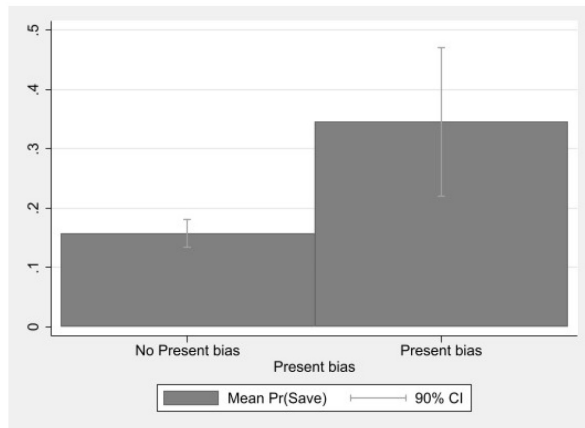
(a) Any savings goal



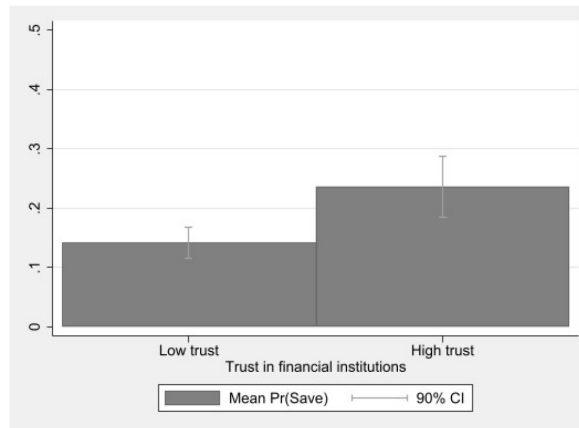
(b) Savings goal, by treatment

# Summary statistics

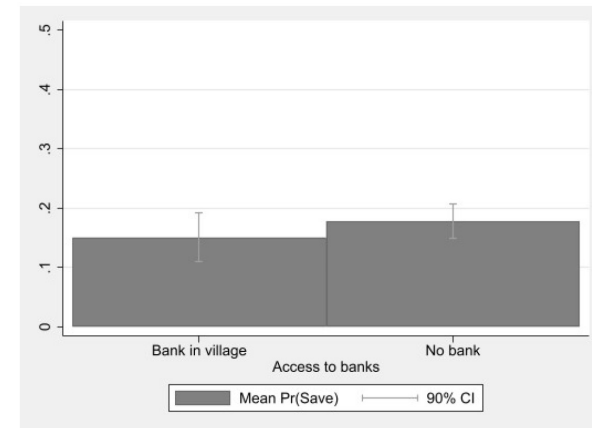
Figure 3: Experimental savings, preferences, and access to banks



(a) Present bias



(b) Financial trust



(c) Access to banks

# Model - Goal Setting

- We estimate whether the messaging had a differential impact on savings for people who set a savings goal.
- For participant  $i$  living in comuna  $c$ , we examine the impact of the messaging treatment,  $T_i$ , and setting a goal,  $G_i$ , on saving in the experimental account,  $Y_i$ .

$$Y_i = \alpha + \beta_1 T_i + \beta_2 G_i + \beta_3 G_i * T_i + \beta_4 X_i + \mu_c + \varepsilon_c$$

- We include comuna fixed effects to control for unobservable geographic and institutional factors that systematically influence savings, and cluster standard errors at the comuna level.
- For robustness we also control for individual level characteristics that may influence savings, even though they are balanced across treatment groups, including: age, female, post-secondary education, risk tolerance, consumer durables index, works o-farm, and whether the participant had a formal savings account at baseline.



# Results - Goal Setting

Table 2: The impact of messages and savings goals

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Pr(Save in experimental account)					IHS(Amount saved in experimental account)				
Treatment	-0.039 (0.050)		0.023 (0.051)			-0.281 (0.364)		0.161 (0.404)		
Set savings goal		0.013 (0.047)	0.154** (0.071)	0.154** (0.072)	0.139* (0.073)		0.231 (0.379)	1.252** (0.602)	1.249** (0.607)	1.117* (0.623)
Set savings goal × Treatment			-0.210*** (0.073)					-1.517** (0.651)		
Reminder				0.010 (0.058)	0.021 (0.059)				0.062 (0.447)	0.103 (0.452)
Reminder + Peer				0.037 (0.056)	0.049 (0.055)				0.254 (0.449)	0.301 (0.454)
Set savings goal × Reminder				-0.207* (0.103)	-0.185* (0.099)				-1.388+ (0.900)	-1.194 (0.858)
Set savings goal × Reminder + Peer				-0.214*** (0.073)	-0.210*** (0.071)				-1.637** (0.642)	-1.595** (0.630)
Additional controls:	No	No	No	No	Yes	No	No	No	No	Yes
Observations	412	412	412	412	397	412	412	412	412	397

+  $p < 0.15$ , \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . OLS estimates. All estimates include *comuna* fixed effects and cluster standard errors at the *comuna* level in parenthesis. Additional controls include: age, female, post-secondary education, standard deviation of risk game choice, index of consumer durables, works off-farm, and whether the respondent currently has a savings account.



# Results - Goal Setting

Table 3: Impact of messages by size of savings goal

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Pr(Save in experimental account)				IHS(Amount saved in experimental account)			
High savings goal	0.009 (0.043)	0.166** (0.079)	0.166** (0.080)	0.133+ (0.082)	0.211 (0.336)	1.374* (0.671)	1.376* (0.679)	1.184* (0.668)
Treatment		0.019 (0.047)				0.140 (0.370)		
High savings goal $\times$ Treatment		-0.229** (0.085)				-1.705** (0.737)		
Reminder			0.012 (0.054)	0.022 (0.055)			0.096 (0.417)	0.156 (0.426)
Reminder + Peer			0.027 (0.052)	0.037 (0.050)			0.186 (0.416)	0.244 (0.416)
High savings goal $\times$ Reminder			-0.252** (0.121)	-0.226* (0.117)			-1.777+ (1.067)	-1.618+ (1.030)
High savings goal $\times$ Reminder + Peer			-0.213** (0.083)	-0.199** (0.078)			-1.659** (0.719)	-1.632** (0.690)
Additional controls:	No	No	No	Yes	No	No	No	Yes
Observations	412	412	412	395	412	412	412	397

+  $p < 0.15$ , \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . OLS estimates. High savings goal equal to 1 if the participant's savings goal exceeded the mean savings goal in the sample (900 Lei). All estimates include *comuna* fixed effects and cluster standard errors at the *comuna* level in parenthesis. Additional controls include: age, female, post-secondary education, standard deviation of risk game choice, index of consumer durables, works off-farm, and whether the respondent currently has a savings account.

# Results - Patience, Trust, and Financial Access

Table 4: Impact of messages by present bias, trust, and financial access

	(1)	(2)	(3)	(4)	(5)	(6)
		Pr(Save)		IHS(Amount saved)		
<b>Panel A: Present bias</b>						
Present bias	0.148*	0.171	0.162	1.385*	1.563	1.487
	(0.085)	(0.160)	(0.164)	(0.717)	(1.322)	(1.342)
Treatment		-0.036	-0.032		-0.258	-0.248
		(0.047)	(0.046)		(0.336)	(0.329)
Present bias × Treatment		-0.037	-0.049		-0.283	-0.374
		(0.207)	(0.205)		(1.743)	(1.716)
Observations	412	412	405	412	412	405
<b>Panel B: Trust in financial institutions</b>						
High trust	0.074+	0.103*	0.073	0.736*	0.904*	0.652
	(0.044)	(0.060)	(0.057)	(0.377)	(0.488)	(0.465)
Treatment		-0.020	-0.027		-0.147	-0.237
		(0.047)	(0.047)		(0.331)	(0.331)
High trust × Treatment		-0.053	-0.025		-0.312	-0.039
		(0.078)	(0.080)		(0.604)	(0.627)
Observations	410	410	403	410	410	403
<b>Panel C: Financial access</b>						
No bank	0.042	-0.025	-0.001	0.241	-0.347	-0.203
	(0.054)	(0.094)	(0.100)	(0.466)	(0.748)	(0.787)
Treatment		-0.099	-0.082		-0.817	-0.735
		(0.086)	(0.089)		(0.660)	(0.677)
No bank × Treatment		0.088	0.066		0.770	0.649
		(0.092)	(0.095)		(0.695)	(0.715)
Additional controls:	No	No	Yes	No	No	Yes
Observations	412	412	405	412	412	405

+  $p < 0.15$ , \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . OLS estimates. All estimates include *comuna* fixed effects and cluster standard errors at the *comuna* level in parenthesis. Additional controls include: age, female, post-secondary education, standard deviation of risk game choice, discount rate, index of consumer durables, and whether the respondent currently has a savings account.





# Conclusions

- We design a randomized intervention in an upper-middle income setting to elucidate how informational nudges impact saving and whether these nudges interact with commitment devices in unintended ways.
- We focus specifically on messaging and goal setting and find that while there is no average effect of messaging on savings, it discourages saving among participants who set goals.
- This effect is driven by participants who set unrealistically high goals, suggesting that messaging unintentionally increases the salience of unrealistic goals and causes high goal setters to adjust their behavior downward in a pattern that is consistent with negative belief updating.
- While goal setting does promote saving, this is only true in the absence of messaging.



# Conclusions

- Our findings are important for the design of savings interventions in upper-middle income countries, where there is a dearth of evidence relative to higher or lower income settings.
- Our results suggest that, on their own, informational nudges have no impact on saving.
- While simple commitment devices like goal setting can encourage saving, these goals ought to be realistic.
- Further, and more importantly, reminding goal setting customers to save or providing them with information about the savings goals of their peers appears to fully reverse the gains of goal setting, suggesting a trade-off between informational nudges and commitment devices in this context.



Thank you !

