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Savings and Prize-Linked Savings Accounts

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ABSTRACT

Savings and Prize-Linked Savings Accounts*

Many households have insufficient savings to handle moderate and routine consumption shocks. Many of these financially fragile households also have the highest lottery expenditures as a proportion of income. This combination suggests that Prize-Linked Savings (PLS) accounts, that combine principal-security with lottery-type jackpots, can increase savings among these at-risk households. Results from an online experiment show that the introduction of PLS accounts increase total savings and reduce lottery expenditures significantly, especially among individuals with the lowest levels of savings and income. The results imply that PLS accounts offer a plausible market-based solution to nudge individuals to increase savings.

JEL Classification: E21, D14, C91, L83, D12

Keywords: savings, individual decision making, personal finance, lotteries, experimental economics

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1 Introduction

In a recent U.S. survey. Lusardi, Schneider and Tufano (2011) found that half of the respondents were unable to come up with $2,000 if an unexpected emergency arose and two-thirds of the respondents in the lowest income bracket had less than $2,000 in savings. Given that unpredictable consumption shocks exceeding $2,000 are routine (Blundell, Pistaferri and Preston, 2008), the low levels of savings and financial illiquidity place many households at risk and create negative externalities associated with financial distress. Substantial theoretical and empirical work has examined the potential causes and solutions to the low savings problem (see, for example, Crossley et al. (2012) for a recent review), yet appropriate policy responses remain unclear.

This paper presents evidence that investigates whether Prize-Linked Savings (PLS) accounts, common outside of the U.S.,[1, 2] can encourage savings, especially among those who are more vulnerable to routine financial shocks. PLS accounts combine the traditional savings account feature that guarantees the principal investment with a lottery that provides a chance for a life changing payoff **(**Kearney, Tufano, Guryan and Hurst, 2011). High lottery expenditures (on average $540 per year in the U.S.) and relatively higher as a proportion of income among households with lower income) suggests a potentially strong appeal for PLS accounts among people with low income (Kearney et al. 2011). Demand for PLS accounts has been found outside the U.S. (e.g., Lobe and H_lzl, 2007; Tufano, 2008). While these studies exhibit demand for PLS accounts, they have a number of important shortcomings. First, these analyses are conducted at a high level of aggregation and as a consequence they are unable to examine distribution of responses across the income range or across different demographic groups. In addition, because of the high level of aggregation, their results at best reflect average households. And in fact since the average is calculated by income weights, their results are most informative about the behaviour of high income households (i.e. the households least targeted by saving policies). On the other hand, micro econometric studies on PLS have been limited to descriptive evidence. Tufano, De Neve and Maynard (2011) examined individual's interest regarding the first U.S. PLS product introduced in 2006. Their survey results indicate that the PLS account appeals more to the heavy lottery players, non-savers and those with low savings.

[1] PLS accounts are currently offered in over 20 countries and have been available since the 1694 'Million Adventure' in the United Kingdom (Murphy, 2005).

[2] Current laws prevent the introduction of PLS accounts (most states in the U.S prohibit privately run lotteries) yet the PLS account opened in Indiana suggests the potential for legal means to introduce the PLS short of changing laws.

The research on PLS accounts, focusing on demand, have thus far been unable to directly examine perhaps the two most important policy questions that we address in the current study. First does the introduction of a PLS account increase total savings or instead cause a reallocation of demand away from other forms of savings, thus not addressing the financial illiquidity problem and not creating new savers. Second, if the PLS account increases total savings, what are the sources of the expenditures?

We address these questions with an online experiment that involves both a representative sample of the population and a disproportionately larger sample of low income and low savings individuals. We first examine whether the introduction of PLS accounts increases total savings and then the sources of the increased total savings. Given the disproportionately higher demand for lottery expenditures among those with lower income,[3] we further examine whether the demand for PLS accounts reduces lottery expenditures. Our results show that the introduction of the PLS account indeed increases total savings, quite dramatically (on average by 12 percentage points), and that the demand for the PLS account comes from reductions in lottery expenditures as well as current consumption. We further show that these results are stronger among study participants with the lowest reported savings. Our results suggest that PLS accounts offer a plausible market-based solution to nudge individuals to increase savings.

The paper proceeds as follows. The following section presents the experimental design and hypotheses, section 3 presents the results and section 4 concludes.

2 Experimental Design

The experiment consisted of a series of individual portfolio allocation decisions in which each subject always had exactly $100. At the end of the experiment one of the decisions was randomly chosen and subjects were paid for this decision with a 10 percent chance, otherwise they received a fixed participation fee.

There were a maximum of four potential sources for participants to spend their $100 budget: (1) receiving cash within two weeks of participation, (2) traditional savings, (3) entering a lottery and (4) a PLS account. Money allocated to cash would be provided to subjects as soon as all the experimental participants had completed the study. We refer to the date of this payoff, identical for everyone, as the Early Period. Money allocated to traditional

[3] Extensive research has tried to explain the higher demand for lotteries and gambling among people with lower income. One approach allows individuals to use subjective probability weighting to over-weight low probability events (e.g., rank-dependent expected utility theory (Quiggin, 1982); cumulative prospect theory (Tversky and Kahneman, 1992). Another approach, skewness, lets utility depend on absolute and relative wealth so lotteries offer an opportunity to move up in terms of relative wealth (Shefrin and Statman, 2000). Crossley et al. (2011) suggest that people can use lotteries to convexify their budget sets.

savings was paid exactly 10 weeks after the Early Period (henceforth referred to as the Later Period) and included the principal investment plus interest. Across the decisions the simple interest rate *r* was *5*, *10* and *20* percent.

Money allocated to the lottery affected the odds that the subject would win a $1,000 jackpot; if the subject did not win the lottery they received nothing for the lottery payoff. Across the decisions, we varied the lottery odds to be either bad (each dollar spent on lottery tickets had an expected payoff of $0.90), fair (each dollar had an expected payoff of $1.00) or good (each dollar had an expected payoff of $1.10). The realization of the outcome of the lottery and subsequent payoff was at the same time as the payoff for the traditional savings account payoff in the Later Period. To ensure subjects knew that the odds of the outcome were legitimate, we had the outcome be a function of information released publically on the day of the jackpot payoff that they could check.[4]

Money allocated to the PLS account provided a guaranteed payoff of the principal investment plus entry into a lottery that had a payoff of $1,000. To make the total payoff to the PLS account comparable to the traditional savings account, we set the expected value of the PLS account for each dollar invested $(1+p_{PLS}*\$1{,}000)$ equal to either *1+.9r (bad PLS odds)*, *1+r (fair PLS odds)* or *1+1.1r (good PLS odds)*. Thus, the PLS bad, fair and good odds (p_{PLS}) were *0.9%*r*, *1%*r* and *1.1%*r*, respectively. We varied the interest rate and the lottery and PLS odds in order to examine the demand for the PLS account under a variety of market conditions in which traditional savings, the lottery and the PLS account would each be relatively more or less attractive to the other options.

The order of the decisions was the same for everyone. Before we had subjects make the decisions that we will use for analysis, we had them make a series of decisions to give them experience with the different products, but with fewer allocation options. In the first three decisions subjects allocated their budget between only cash in the early period and traditional savings (one decision for each interest rate). In the second three decisions subjects allocated their budget between only cash and the lottery (one decision for the good, fair and bad lottery odds). These first six decisions provided subjects with experience making choices with all the potential options other than the PLS account.

[4] Specifically, subjects who allocated money to the lottery received a randomly determined range of numbers such that was proportional to 1,000,000. For example, if subjects had a 5 percent chance of winning the $1,000 jackpot, then they were given a range of numbers that included 50,000 possible numbers. The individual would then win the $1,000 jackpot if their range of numbers included the number whose first two digits were the last two digits of Dow Jones Index followed by the last two digits of the NASDAQ index followed by the last two digits of the S&P index. We estimated that all six digits were approximately random and equally likely to occur, thus all numbers between 0 and 999,999 were approximately equally likely. We also gave subjects the web address where the three index numbers would be available for them to check.

The next nine decisions let subjects allocate their budget between cash, traditional savings and the lottery. The nine decisions examined every combination of the three interest rates and the three lottery odds. These decisions provide a baseline for the portfolio allocation without the PLS account. The final 15 decisions included the option to invest in the PLS account in addition to the three other options of cash, traditional savings and the lottery. Table 1 indicates all 15 portfolio allocation situations we gave to subjects and the corresponding PLS odds. The 15 decisions included every combination of the interest rate and the PLS odds when the lottery odds were fair. We also included three PLS odds conditions when the lottery odds were bad and the traditional savings account offered a 5% return when the lottery odds were bad and the traditional savings account offered a 20% return. We chose to not include all 27 potential combinations of interest, lottery odds and PLS odds not only to reduce the time of the experiment and the cognitive effort to avoid decision fatigue, but also because the omitted decisions involved situations in which the lottery odds were bad traditional savings account paid a high interest rate or the lottery odds were good and the traditional savings paid a low interest rate; we anticipated that in these conditions subjects would be least likely to have allocated their budget to both the lottery and traditional savings, and so would not be as interesting to the question of how the PLS account affects reallocation.[5]

[Table 1- Odds]

For each decision, subjects could allocate their portfolio in $20 increments to each of the possible resources available.[6] The amount allocated to each option had to add up to exactly $100 for each decision before the subject could continue to the next decision. While past experiments examining inter-temporal choice have more commonly required money to be allocated to either everything in the present or all in the future, the current approach allows subjects to smooth their asset portfolio. Andreoni and Sprenger (Forthcoming) introduced the method used here to 'convexify' the portfolio allocation over time. Our approach further allows us to test not only the likelihood that someone invests in a PLS account, but the intensity of the investment (e.g., investing 20% or 100% of their budget).

After all the portfolio allocations decisions were completed, a short survey was given to collect demographic information as well as information on subjects' financial situation and

[5] Across the first 9 decisions before the PLS introduction, 27% of our subjects allocated their money to all three possible options, and 65% allocated a positive amount to at least two of the three options. The detailed statistics are reported in the Appendix Table 1.

[6] As a robustness check we also conduct a similar experiment with a continuous budget set. Results are presented in the section (3.3.2).

savings behavior. The entire study took on average 29 minutes (69 minutes standard deviation) to complete.

We used two sources to recruit subjects. The first was Study Response (SR), an online panel that has been used in past experimental work and whose subject panel characteristics reflect the U.S. population. For this population, we varied the fixed participation fee (if they did not get paid for one of their decisions) to be either $8 or $12. The advertisement for participation indicated either a $12 or $8 payment in order to measure whether the lower participation fee would attract a disproportionately lower income sample of participants. However, as shown below, the difference in the advertised participation payment had no effect on either the participation rate or any of the characteristics of the participants.

The second source for recruitment was MTurk, an online labor market panel who sign up for short duration projects with a very low fixed participation fee (usually under $2 per hour). For these subjects, we were unable to vary the payment based on the decisions they made due to MTurk payment rules, so we ran the identical study except that we added one initial page that informed subjects they would get the standard MTurk fixed payment rate (and would not get paid for any of the decisions), but asked them to make decisions as if they would get paid according to the instructions. Otherwise the experiment was identical for the two groups. We chose to include the MTurk population since, as we will show below, the MTurk population[7] has both lower income and less savings, which provides us with a larger sample of the population at risk that we wish to study. As we will show below, the behavior of the MTurk sample is remarkably similar to the incentivized SR participants. Moreover, Horton, Rand and Zeckhauser (2011) find that the results from three common laboratory experiments (a loss-gains experiment, a prisoners' dilemma game and dictator game) are replicated using an MTurk population, and Garbarino and Slonim's (2006, 2009) results from the SR population also replicate laboratory results.

Table 2 presents the population characteristics. Column 1 shows the MTurk sample, Column 2 shows the combined SR sample, and Columns 4 and 5 show the $8 and $12 SR sample separately. T-tests (Column 6) show that none of the characteristics differs between the two SR $8 and $12 populations, and Column 3 indicates that the MTurk population systematically differs as anticipated from the SR respondents. MTurk respondents most importantly have lower income, are less likely to be employed, are younger and have less money in savings. Thus, the MTurk population includes a higher proportion of individuals

[7] We restrict our survey to only MTurk users from United States.

with low reported savings and are thus at greater risk for routine consumption shocks. Throughout the analyses we will always control for the characteristics presented in Table 2.

[Insert Table 2 –Descriptive Statistics]

At the end of the experiment, we asked respondents whether they would be interested in investing in PLS accounts.[8] Table 3 reports the descriptive statistics for this question. This analysis is a useful replication of Tufano et al. (2011) study on data collected differently, but from the same economic environment. However, additional value flows from particular and unique features of our experimental data. Our respondents have been experienced with PLS accounts during the experiment and therefore have better knowledge about this saving product.

The first 4 columns of the table report the univariate differences between respondents. In total, 26% of participants expressed no interest in the PLS accounts, 7% responded "Don't know" and 12% of respondents expressed a positive interest to invest in the PLS. The biggest proportion of the participants, 56%, responded as their decision to invest is determined by the actual PLS product characteristics (prizes, odds of winning etc.). The cross tab also shows that men, younger persons, unemployed individuals and people with lottery expenditures more than $150 and people with low savings (less than $10,000) show slightly higher demand for PLS accounts. These results are consistent with Tufano et al (2011). The last 2 columns of the table report the multivariate logistic regression of expressing an interest in PLS account on demographic and socio-economic characteristics. Odds ratios reported on Column 5 compare the interested individuals to all others (this includes the individuals who responded "No", "depends on the actual product offered" and "Don't know"). Column 6 combines the individuals who responded "Yes" and "depends on the actual product offered";the odds ratio compares these individuals with those that were not interested or didn't know. The results are again similar to Tufano et al (2011) in that high lottery expenditure and low levels of savings are the predictive factors of greater PLS interest. These results are also important to confirm that our working sample is similar to the ones studied in the field, thus representative of the U.S population in general.

[Insert Table 3 – Survey of PLS Interest]

[8] The exact wording of the question is "Would you invest money in a prize linked savings (PLS) product if a financial institution offered it ?"

Assuming demand for the PLS, our aim is to shed lights on three important policy questions that have not been addressed in the literature previously. First, whether the introduction of PLS generates net new saving (rather than a re-allocation of savings that would have happened anyway). Second, if the PLS account increases total savings, what the sources of the expenditures. Third, whether there are heterogeneous impacts of PLS; in particular, is there an effect on low income households who are most at risk?

These are obviously important issues and common questions in the saving literature[9], yet they have difficult to answer. One obstacle that needs to be overcome in answering these questions is to find appropriate micro level data to evaluate total savings and consumption of the individuals across time. The ideal data should be longitudinal, not time series or cross sectional, in order to be used to appropriately determine whether the funds in the new accounts are new savings or not. In addition, to properly address the subsequent questions, the longitudinal data should be very detailed and collected from a representative sample of the general population. To obtain such information from field could be difficult and expensive while it is relatively easier and affordable in our artefactual framed experiment.

The next section summarizes the predictions of neoclassical and behavioral economics on the potential effects of PLS account on household portfolios.

2.1 Hypotheses

The introduction of the PLS alters the choice set for individuals, who now have the option of investing in a novel financial product which possesses the salient features of lottery tickets, with the appeal of skewness, and traditional savings, with liquidity and principal-security. Tufano (2008) and Pfiffelmann (2008) present thorough theoretical discussions of the appeal of such a hybrid financial product to the savers. In order to understand the implications of these discussions on the household portfolio allocation decision, consider a generic utility maximization problem. Prior to the introduction of the PLS product subjects can allocate $\alpha, \beta, and\ \theta$ of their budget into current consumption (C), traditional savings (S) or lottery expenditures (L) and obtain utility $U(\alpha C, \beta S, \theta L)$ subject to $\alpha+\beta+\theta=1$. With the option to invest in the PLS account, individuals can also allocate γ into the PLS asset and obtain utility $U(\alpha^* C, \beta^* S, \theta^* L, \gamma^* PLS)$ subject to $\alpha^*+\beta^*+\theta^*+\gamma^*=1$. The hypotheses are:

[9] For example, these questions are related to largely inconclusive literature on tax-favored saving accounts. There is a little consensus on whether these accounts led to real increase in net saving in U.S.. For example, Poterba, Venti and Wise (2006) argue that saving in tax favoured accounts in the U.S. is largely new saving while Engen, Gale and Scholz (1996) conclude the opposite.

H1: PLS product may attract people with loss aversion therefore may lead them to reallocate funds from the lottery and consumption to the PLS. *Hence, expenditure on lottery tickets and consumption will decrease, or remain constant:* $\theta^* \leq \theta$ *and/or* $\alpha^* \leq \alpha$
Loss averse (Kahneman and Tversky, 1992) individuals may allocate some of their funds from lottery or consumption to PLS due to the "no principal loss" aspect of the PLS. Additional funds might come from the fact the individuals might choose to take risk on the small gambles rather than the large ones (Pfiffelmann, 2008), hence we can observe a shift from consumption funds to the PLS in which the risk is actually losing the potential interest but not the principal.

H2: After the PLS introduction, individuals may allocate some savings from traditional savings to PLS, thereby *Traditional savings levels will decrease, or remain constant:* $\beta^* \leq \beta$.

Savers that have preference for skewness in returns may allocate some of their funds to PLS which offers the same expected return but with a small chance of winning large amounts (Freidman and Savage, 1948).

H3: Total savings will increase, or remain constant: $\beta^* + \gamma^* \geq \beta$.
If the money allocated to the PLS is sourced from the current consumption or lottery expenditure PLS increases the total savings. This also implies that there is a possibility that the introduction of the PLS may generate new savers (who would not save without PLS otherwise).

In order to determine whether the PLS leads to genuinely new savings, we need to confirm that *(H1)* is true. Another point is that if the majority of demand for PLS comes from existing savings (*H2*), this may adversely affect individual's future welfare, since her future resources might have been lowered. We empirically investigate these issues using our experimental data.

3 Results

We first examine whether the introduction of PLS accounts increase total savings of subjects and then the sources of the increased in total savings. Specifically, we examine whether the PLS accounts reduce consumption and lottery expenditures, and hence generate

new net savings. We present our results for the full sample as well as a restricted sample that includes only the participants with "$0" reported savings on our survey, who are the targeted population of PLS. In the last part, we do a series of robustness checks of our results.

3.1 Total savings analysis

[Insert Figure 1]

Figure 1 shows the mean level allocated to total savings before and after the introduction of the PLS. From this figure it is clear that across all groups, total savings increase substantially after the introduction of the PLS. In the full sample, participants on average increased their savings by 25 percent ($12 from $48 to $60). Most importantly, we see the highest increase, for subjects with reported savings of $0. For this group, total savings increased by $16.2 (approximately 40 percent as the mean of the savings before PLS introduction is $41). To test whether these differences are statistically significant, we estimate the following fixed effect model:

$$TS_j^i = X_j\beta + \alpha P_j + \delta^i + e_j^i \qquad \textbf{(1)}$$

Note that *"i"* indexes individual and j indexes the period (i.e., the decision); e_j^i is a regression disturbance. The variable TS_j^i represents the level of total savings of individual *"i"* in period "*j*". This is the sum of money that is allocated to interest bearing account and PLS. P_j is a dummy variable which is equal to 1 when the PLS is introduced. X_j is a vector containing the price variable indicators – *fair PLS odds and good PLS odds, fair lottery odds and good lottery odds,* and *10 percent interest rate and 20 percent interest rate* – where *bad PLS odds, bad lottery odds* and *5 percent interest rate* were taken *as the base case*. δ^i is individual fixed-effects. We estimated this fixed effect model (eqn.(1)) by using linear regression[10]. Since we are also interested in the effect of PLS on non-savers, we re-estimate eqn.(1), focusing on only the extensive margin. In particular, we estimated Probit model for participation in savings to examine the effect of PLS while holding the personal characteristics constant.

[10]A statistical issue arises from the fact that total savings are bounded between 0 and 100. To address this, one can employ two-limit Tobit estimation (with upper and lower limits at 100 and 0). However nonlinear panel data models with fixed effects is widely understood to be biased and inconsistent (Hahn and Newey ,2004 and Wooldridge, 2002). Further random effects will not solve any of the problems of omitted variable bias. Never the less, we also estimated fixed effect tobit models and tobit models with additional controls, the marginal effects from these regressions are very close to our estimates. They are available upon request from authors.

[Insert Table 4]

Table 4 presents the estimates from Model 1. The top panel reports estimates for the full sample and the bottom panel reports estimates from the restricted sample that includes only participants with $0 reported savings. For each panel, Column 1 presents estimates without price variables; Column 2 adds these additional price controls. The probit estimates are reported in Column 3, and marginal effects calculated at the mean of data are reported in Colum 4. In both panels, and all three specifications, the estimates for PLS introduction dummy variable is positive and significant at the 1 percent level of significance. Column 1 shows that PLS increases total savings in the full sample on average by $12. The specification with the full price vector, Column 2, shows that (i) when lottery odds improve total savings decreases and (ii) when the interest rate increases from 5%, the total saving increases too. More importantly after controlling for these price controls, PLS still increases the total saving by approximately $12 (or, since the mean of savings before PLS introduction is about $48, about 25 percent). In this specification, the coefficient for *Good PLS odds* is positive and significant at 10 percent significance level, which indicates that the presence of a PLS product with a greater expected return than traditional interest savings increases total savings even further compared to the PLS with *bad* odds (which is the base case). However, this is only a small increase – less than a dollar. We also do not see any additional effect of offering *fair* odds for PLS compared to the base (bad) case. This indicates that it is the availability of PLS products and not their expected return relative to lottery or traditional savings encourages saving in our experiment.

The probit estimates are qualitatively similar to the OLS estimates. Marginal effects of the probit estimates in the last column indicates that the introduction of the PLS reduces the likelihood of savings $0 by approximately 6 percent. The results are strongly statistically significant and in accord with prediction that PLS induces savings amongst subjects who did not previously save, thus generating new savers.

As noted above, we also present results for a restricted sample that includes individuals with low level of reported savings. Panel B of Table 4 indicates that our basic results hold stronger for the restricted sample.[11] In particular, the introduction of PLS increases the total savings by approximately $15 (or, since the mean of savings before PLS introduction for restricted group is about $41, 36 percent) and reduces the likelihood of not saving by 11

[11] We test whether this difference is significant by estimating model 1 with interactions for the PLS savers by $0 reported savings. The difference of the PLS interaction effect is $4.74 (P-value 0.110).

percentage points in this group. The effect is comparable to the widely used policy instrument "interest rate". For example, increasing the interest rate from 5% to 20% increases average total savings a smaller amount ($14) than introducing the PLS. Thus, this is a strong effect.

3.2 Sourcing PLS demand

In section 3.1, we established that the introduction of the PLS account increases the average total savings of our participants and especially our low income participants (*H3*). The critical question left unanswered is what the sources of these new funds are, or in other words, how much consumption and lottery expenditures (*H1*) are reduced? And how much traditional savings are affected (*H2*)?

In order to address these questions, we analyzed participant's portfolio allocation decisions along with current consumption, lottery expenditures and traditional interest bearing savings, and the effect of the PLS introduction on these allocations. We estimated the following fixed effect model:

$$Y_{jk}^{i} = X_{jk}\beta_k + \alpha_k P_j + \delta^i + e_{jk}^{i} \qquad \textbf{(2)}$$

The variable Y_{jk}^{i} represents the amount allocated to resource "k" (i.e., current consumption or traditional savings or lottery) of individual *"i*" in period "*j*" and right-hand side is defined in (3.1).

Table 5 shows that for both samples, the average amount of all assets decreased after the introduction of PLS. Proportional to the pre PLS mean allocations, we observe the smallest decline in traditional savings. It is decreased by only 9 percent compared with current consumption and lottery expenditure, which both decreased by approximately 23 percent. The results are much stronger in the restricted sample. First, in this sample we do not observe a significant decline in the traditional savings after the introduction of PLS. Second, both consumption and lottery expenditures are reduced in much bigger amounts, by 26 and 24 percent of their pre-PLS means respectively.

PLS price indicators show that subjects find the introduction of PLS sufficient to delay their consumption, as the price variables do not elicit a response significantly different from zero for current consumption. Thus, when subjects' choice set is altered with the introduction of the PLS, they are 'nudged' towards saving more regardless of the return of the PLS product. However both lottery expenditures and traditional savings are affected by the PLS odds in full sample, when the odds of winning the $1,000 PLS jackpot are good, subjects

reduce an additional \$2.4 (or 4.5 percent of the pre-PLS mean) from traditional savings and their lottery ticket expenditure decreases by additional \$1. This is in accord with the idea that PLS is considered as alternative to both savings and lottery.

Another important point is assessing the effect of PLS on the future resources of the subjects. This might be of interest since our results are showing that subjects are actually foregoing some of their certain interest income (by reducing their traditional savings) in favor on the PLS with a partially uncertain future income. We investigate this issue by generating the amount of savings guaranteed for future total savings (that equals the $Traditional\ Savings_i*(1+r_j) + PLS_i$) and examining the change in this measure before and after the introduction of the PLS. The results[12] show that the PLS introduction is causing again substantial increases in the guaranteed future savings amount by \$11 and \$14 in full and restricted samples respectively. Overall, these numbers are compatible with the hypotheses that PLS generates new savings and that most of the demand for the PLS account comes from reductions in lottery expenditures, as well as current consumption. We further find that these results are again much stronger among the participants with lowest reported savings.

3.3 Further checks

There are potential concerns with our results, which are as follows. First, our participants come from 2 different online panels MTurk and Study Response. Since the payment mechanisms differ in these two panels, PLS introduction may have differential effects between the MTurk and Study Response groups. Secondly, since in the current experiment the choice set of participants are discretized to the options of \$0, \$20, ..., \$100, we might be overstating the effect of the PLS. In this subsection we address both of these issues.

3.3.1 Payment mechanisms

MTurk subjects were compensated using a flat-fee system with subjects receiving a \$1.50 fee for completing the experiment. For Study Response (SR) population, at the end of the experiment one of the decisions was randomly chosen and subjects were paid for this decision with a 10 percent chance, otherwise they received a fixed participation fee. We varied the fixed participation fee (if they did not get paid for one of their decisions) to be either \$8 or \$12. This raises issues of differential responses to the PLS introduction between the MTurk and Study Response groups. To analyze this issue, we estimate following model:

[12] For the brevity of the paper, we didn't report the results. But they are available upon request from authors.

$$TS_j^i = \beta_0 + \beta_1(SR8)^i + \beta_2(SR12)^i + \alpha_1 P_j + \alpha_2[P_j x(SR8)^i] + \alpha_3[P_j x(SR12)^i] + e_j^i \quad \textbf{(3)}$$

where the group dummy variables are indicating whether the individual is recruited from \$8 SR or \$12 SR groups (MTurk group is the omitted base case). We interact these dummy variables with the PLS introduction dummy to capture the differential responses of the groups to the PLS.

Column 1 of Table 6, shows that although Study Response groups are saving less and responding weaker to the PLS introduction than the MTurk group, however none of these differences are statistically significant. There is also no statistically-significant difference between the savings behavior of the two Study Response subgroups (P-value is 0.75 for the t-test of difference of PLS response). For completeness we present results separately for MTurk and Study response groups. Columns 3 and 4 show that in the Study Response groups, the PLS introduction statistically and significantly increases the savings by \$7 (15 percent of pre-PLS mean). PLS introduction increases MTurk participants more than SR groups and approximately the same level as our restricted sample of low saving sample.

These results are not surprising, as we showed in Table 2, both Study Response groups shared similar characteristics and differ from MTurk population systematically. Most importantly, MTurk respondents have less money in savings and are less likely to be employed. Thus, the MTurk population includes a higher proportion of individuals with low income and low savings and is therefore similar to our restricted sample where we observed a bigger response. Overall, we find significant effects of PLS regardless of the sample used.

[Insert Table 6]

3.3.2 Continuous Choice Set

In the current experiment, subjects are allowed to allocate their portfolio in \$20 increments to each of the possible choices available. We chose this discretization to simplify communicating the odds of winnings the lottery and PLS, and hence to make the task cognitively less demanding. This raises two concerns. First, our magnitude estimates may overstate the effect of the PLS. Second, the decisions on the intensive margins might be ignored and people might have been forced to make arrangements on the extensive margins (i.e. since they cannot shift \$1, they may choose \$0 on one allocation and \$20 on another). In order to investigate these issues, we conduct a follow up experiment in MTurk with continuous budget sets. The design and procedures of the experiment are the same as the first

MTurk experiment (section 2). The only change is we discard 5% interest rate, therefore shorten our survey to 18 decisions. Subjects are also allowed to allocate any integer between 0 and 100 to their choices. Seven-hundred-thirty-seven subjects were recruited with a $1.50 flat fee[13] on MTurk.

[Insert Table 7]

Table 7 presents, the results for total saving (Model (1)) and portfolio allocation (Model (2)) analyses. The results indicate that our basic results hold (although slightly weaker) for the continuous choice set. In particular, the introduction of PLS increases the total savings by approximately $9 and reduces the likelihood of not saving by 3 percentage points in the full sample. Both of the results are highly significant. The results for the restricted sample are also very similar to our base results. When we examine the portfolio allocation of participants, we see that lottery and consumption expenditures are decreasing more than the traditional savings after PLS introduction. Thus we conclude that our basic results are not being driven by the discrete choice set we used.

4 Conclusion

This paper explores the introduction of a novel financial product – PLS, which exploits the broad appeal of lottery tickets to influence individuals' choice to save. By using an online experiment, we examine the effect of the PLS introduction on individual's portfolio allocations. Our results show that the introduction of the PLS indeed increases total savings, quite dramatically (on average by 12 percentage points), and that the demand for the PLS account comes from reductions in lottery expenditures, as well as current consumption. Hence, PLS led to genuinely new savings and even generates new savers. We further showed that these results are stronger among our participants with the lowest levels of savings and income whom are targeted for saving policies**.**

The results suggest that PLS accounts offer a viable approach to increase savings among everyone, but especially among those who are the most at risk for routine shocks. The availability of PLS products from the private sector could 'nudge' households towards saving more in the same manner that the framing of choices and the setting of default options has been shown to have an effect on other household decisions (Thaler and Sunstein, 2008)

[13] Descriptive statistics for this sample is presented in the Appendix Table 2

without having to either mandate changes in savings behavior or involve potentially costly government programs.

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TABLES

Table 1 – Experimental Conditions after PLS introduction

		Lottery Odds Bad			**Lottery Odds Fair**			**Lottery Odds Good**		
		r=5%	r=10%	r=20%	**r=5%**	**r=10%**	**r=20%**	r=5%	r=10%	**r=20%**
PLS odds	**Bad**	.0045			.0045	.009	.018			.018
	Fair	.005			.005	.01	.020			.020
	Good	.0055			.0055	.011	.022			.022

Table 2 –DESCRIPTIVE CHARACTERISTICS						
	(1) **MTurk**	(2) **Study Response**	(3) *Difference (1)-(2) t test*	(4) **$8 Group**	(5) **$12 Group**	(6) *Difference (4)-(5) t test*
Gender			*P-Value*			*P-Value*
Male	0.47	0.51	0.000	0.53	0.50	0.171
Female	0.53	0.49		0.47	0.48	
Age						
18-25	0.29	0.04	0.000	0.05	0.02	0.322
26-45	0.53	0.48	0.301	0.54	0.41	0.303
46-65	0.17	0.42	0.000	0.35	0.48	0.160
Over 65	0.01	0.06	0.000	0.05	0.07	0.682
Marital Status						
Single	0.52	0.30	0.001	0.33	0.27	0.730
Married	0.40	0.58	0.000	0.58	0.59	0.912
Divorced	0.08	0.12	0.178	0.11	0.13	0.745
Education						
Less than High School	0.01	0.02	0.417	0.04	0.00	0.160
High School	0.38	0.27	0.038	0.28	0.25	0.715
Bachelor's degree	0.41	0.43	0.534	0.42	0.45	0.493
Technical	0.07	0.09	0.616	0.07	0.11	0.519
Postgraduate	0.14	0.19	0.000	0.21	0.18	0.036
Employment						
Full-time	0.39	0.82	0.000	0.82	0.82	0.657
Part-time	0.20	0.09	0.007	0.11	0.07	0.531
Unemployed	0.24	0.02	0.007	0.02	0.02	0.990
Retired	0.02	0.05	0.060	0.02	0.07	0.167
Other	0.15	0.02	0.000	0.04	0.00	0.160
Born in the USA	0.93	0.92	0.424	0.90	0.93	0.531
Reported Saving						
$0	0.15	0.09	0.104	0.12	0.05	0.198
$1-$1,000	0.44	0.29	0.005	0.28	0.30	0.791
$1,001-$2,000	0.11	0.12	0.708	0.15	0.09	0.272
$2,001-$5,000	0.14	0.16	0.608	0.16	0.16	0.968
$5,001-$10,000	0.07	0.13	0.044	0.09	0.18	0.157
$10,001-$30,000	0.05	0.10	0.066	0.11	0.09	0.777
Over $30,000	0.04	0.11	0.005	0.09	0.13	0.524
N	**449**	**113**		**57**	**56**	

Table 3 –Survey of Interest in PLS Accounts

	(1)	(2)	(3)	(4)	(5)	(6)
	"Would you invest money in a prize linked savings (PLS) product if a financial institution offered it?" *Descriptive Statistics*				Multivariate Logistic **Odds Ratio**	
	Yes	Depends on the Actual Product Offered	No	Don't Know	Yes (1) vs Rest	(1) + (2) vs Rest
	12%	*56%*	*26%*	*7%*		
Reported Saving						
$0	11%	52%	25%	12%	2.63	0.99
$1-$1,000	12%	57%	24%	7%	2.67	1.45
$1,001-$2,000	16%	50%	25%	9%	1.15	0.79
$2,001-$5,000	7%	63%	26%	4%	1.47	1.68
$5,001-$10,000	21%	44%	31%	4%	4.21*	1.37
$10,001-$30,000	6%	71%	18%	6%	0.79	2.30
Over $30,000	7%	47%	46%	0%	Base Case	B.c.
Lottery Expenditure						
$0	12%	47%	34%	7%	B.c.	B.c.
$1-$150	11%	60%	22%	7%	1.25	1.79***
>$150	15%	73%	8%	4%	1.66*	5.71***
Gambling						
Never	13%	49%	30%	8%	1.50	1.05
Other	11%	58%	24%	6%	B.c.	B.c.
Financial Risk Profile						
Safe	12%	57%	26%	5%	B.c.	B.c.
Neutral	10%	55%	25%	10%	0.71	0.73
Risky	18%	52%	25%	5%	1.04	0.93
Relative Wealth						
Much worse off	7%	54%	32%	7%	0.15	0.34
Somewhat worse off	11%	59%	22%	8%	0.32	0.55
About the same as others	11%	56%	25%	8%	0.29	0.38*
Somewhat better off	14%	51%	32%	3%	0.40	0.38
Much better off	23%	23%	18%	5%	B.c.	B.c.
Gender						
Male	16%	54%	26%	4%	2.56***	1.16
Female	8%	57%	26%	9%	B.c.	B.c.
Age						
18-25	15%	55%	23%	6%	2.24	0.70
26-45	12%	55%	26%	6%	1.72	0.63
46-65	8%	54%	28%	10%	B.c.	0.45
Over 65	0%	82%	18%	0%	B.c.	B.c.
Marital Status						
Single	12%	59%	23%	6%	B.c.	B.c.
Married	13%	51%	29%	7%	1.87*	0.78
Divorced	4%	62%	28%	6%	0.46	0.89
Education						
High School or Less	10%	61%	19%	10%	B.c.	B.c.
Bachelor's degree	10%	60%	21%	9%	1.19	0.98
Technical	15%	50%	31%	4%	1.54	0.75
Postgraduate	8%	56%	30%	6%	0.68	0.73
Employment						
Full-time	12%	58%	25%	5%	1.28	1.42
Part-time	11%	54%	28%	7%	1.37	1.18
Unemployed	15%	50%	22%	12%	2.04	1.40
Retired & Other	8%	56%	32%	4%	B.c	B.c

Notes to Table 3:

1- First four columns report the percentage results of the PLS question broken down by the characteristics of respondents. The question asked is “Would you invest money in a prize linked savings (PLS) product if a financial institution offered it”.
2- Columns 5 and 6 report multivariate logistic regression of expressing an interest in PLS account on demographic and socio-economic characteristics. Odds ratios reported on column 5 compares the interested individuals to all others (This includes individuals who respondent as “No”, “depends on the actual product offered” and ”Don’t know”). Column 6 combines the individuals who respondent as “Yes” and “depends on the actual product offered”, odds ratio compares these individuals with those that were not interested or didn’t know.
3- Number of observation is 562 and Pseudo R2 is 0.095 for column 5 and 0.057 for column6.
4- * $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table 4: The effect of PLS Introduction on Total Allocation to Savings

Panel A *: Full Sample – (562 Subjects-13,488 observations)*

	Linear Regression $TS_j^i = X_j\beta + \alpha P_j + \delta^i + e_j^i$		**Probit** $P(TS_j^i > 0) = F(X_j\beta + \alpha P_j)$	
	(1)	(2)	Coefficients	**Marginal Effects**
PLS introduced	12.24***	11.99***	0.28***	0.07
	(0.99)	(0.98)	(0.04)	
Fair PLS odds		-0.14	-0.02	-0.00
		(0.44)	(0.04)	
Good PLS odds		0.98**	0.03	0.01
		(0.50)	(0.04)	
Fair lottery odds		-0.72*	0.01	0.00
		(0.42)	(0.03)	
Good lottery odds		-2.78***	-0.04	-0.01
		(0.55)	(0.03)	
10% interest rate		8.64***	0.24***	0.06
		(0.84)	(0.03)	
20% interest rate		17.52***	0.45***	0.11
		(1.17)	(0.04)	
Adjusted R^2	0.58	0.61		
Fixed Effects	Yes	Yes		No
Additional Controls	No	No		Yes
Mean Allocation before PLS			*48.08*	
% of non-savers before PLS			*22%*	

Panel B*: Restricted Sample – Individuals with reported savings of $0- (76 Subjects; 1,824 observations)*

	(1)	(2)	(3)	
PLS introduced	16.33***	15.02***	0.44***	0.11
	(1.17)	(2.89)	(0.10)	
Fair PLS odds		0.61	-0.02	-0.01
		(1.03)	(0.12)	
Good PLS odds		1.74	0.01	0.00
		(1.23)	(0.12)	
Fair lottery odds		-0.22	0.02	0.00
		(0.95)	(0.08)	
Good lottery odds		-0.14	0.03	0.01
		(1.18)	(0.09)	
10% interest rate		9.14***	0.27***	0.07
		(2.52)	(0.08)	
20% interest rate		14.25***	0.39***	0.10
		(3.18)	(0.10)	
Adjusted R^2	0.59	0.61		
Fixed Effects	Yes	Yes		No
Additional Controls	No	No		Yes
Mean Allocation before PLS			*44.66*	
% of non-savers before PLS			*29%*	

Notes to Table 4:

1 – Additional controls are dummy variables for age, education, marital status, employment status, reported saving levels, and born place of subjects. These are summarized in Table 2.

2-Robust standard errors clustered by subjects are in parentheses.

3- The base case in columns 2 and 3 is *bad PLS odds, bad lottery odds* and *5 percent interest rate.*

4- * p<0.1, ** p<0.05 , *** p<0.01

Table 5: The effect of PLS Introduction on Portfolio Allocation

$$Y_{jk}^{i} = X_{jk}\beta_k + \alpha_k P_j + \delta^i + e_{jk}^{i}$$

Panel A *: Full Sample – (562 Subjects-13,488 observations)*

	Current Consumption	Lottery Expenditure	Traditional Savings
	(1)	(2)	(3)
PLS introduced	-7.13***	-4.86***	-4.95***
	(0.85)	(0.68)	(1.05)
Fair PLS odds	0.34	-0.18	-1.25***
	(0.39)	(0.32)	(0.42)
Good PLS odds	0.06	-1.04***	-2.43***
	(0.47)	(0.36)	(0.60)
Fair lottery odds	-2.33***	3.06***	-0.76*
	(0.34)	(0.43)	(0.40)
Good lottery odds	-3.11***	5.89***	-3.17***
	(0.43)	(0.58)	(0.49)
10% interest rate	-7.22***	-1.44***	10.74***
	(0.75)	(0.48)	(0.93)
20% interest rate	-14.00***	-3.54***	19.56
	(0.87)	(0.63)	(1.23)
Adjusted R^2	0.62	0.53	0.60
Fixed Effects	Yes	Yes	Yes
Mean Allocation before PLS	*31.5*	*20.42*	*48.08*

Panel B*: Restricted Sample – Individuals with reported savings of $0- (76 Subjects; 1,824 observations)*

	Current Consumption	Lottery Expenditure	Traditional Savings
PLS introduced	-9.53***	-5.48***	-3.08
	(2.48)	(1.94)	(2.74)
Fair PLS odds	-0.12	-0.50	-0.45
	(1.14)	(0.83)	(1.18)
Good PLS odds	-0.83	-0.91	-1.84
	(1.38)	(1.12)	(1.72)
Fair lottery odds	-2.21**	2.43**	-0.18
	(0.81)	(0.91)	(0.98)
Good lottery odds	-3.31	3.45**	0.00
	(1.22)	(1.31)	(1.17)
10% interest rate	-8.85***	-0.28	13.13***
	(2.52)	(1.07)	(2.81)
20% interest rate	-13.77***	-0.48	17.76***
	(2.91)	(1.35)	(3.24)
Adjusted R^2	0.60	0.58	0.61
Fixed Effects	Yes	Yes	Yes
Mean Allocation before PLS	*34.14*	*21.20*	*44.66*

Notes to Table 5:
1 - Robust standard errors clustered clustered by subjects are in parantheses.
2 - Each Tobit model allows for censoring below and above (at $0 and $100)
3- The base case is *bad PLS odds, bad lottery odds* and *5 percent interest rate.*
4- * p<0.1, ** p<0.05 , *** p<0.01

Table 6: Payment mechanisms

$$TS_j^i = \beta_0 + \beta_1(SR8)^i + \beta_2(SR12)^i + \alpha_1 P_j + \alpha_2[P_j x(SR8)^i] + +\alpha_3[P_j x(SR12)^i] + e_j^i$$

	Group Differences	***The effect of PLS Introduction on Total Allocation to Savings on*** $TS_j^i = X_j\beta^i + \alpha^i P_j + \delta^i + e_j^i$		
	Full Sample	**MTurk**	**$ 8 Study Response Group**	**$ 12 Study Response Group**
	(1)	(2)	(3)	(4)
$ 8 Study Response Subject (SR8)	0.20			
	(4.49)			
$ 12 Study Response Subject (SR12)	-1.51			
	(4.32)			
PLS Introduced	12.97***	12.73***	9.78***	8.29***
	(1.10)	(1.12)	(2.83)	(0.39)
PLS Introduced *SR8	-2.95			
	(3.02)			
PLS Introduced *SR12	-4.29			
	(3.23)			
Fair PLS odds		-0.02	-1.50	-0.32
		(0.51)	(1.42)	(1.11)
Good PLS odds		0.81	1.21	2.10*
		(0.58)	(1.34)	(1.14)
Fair lottery odds		-0.90*	0.07	-0.08
		(0.47)	(1.48)	(1.35)
Good lottery odds		-2.94***	-1.09	-3.11
		(0.62)	(1.25)	(2.09)
10% interest rate		10.01***	3.02	3.35
		(0.95)	(2.13)	(2.88)
20% interest rate		20.24***	3.63	9.88**
		(1.30)	(2.84)	(4.05)
Adjusted R^2	0.03	0.61	0.63	0.58
Fixed Effects	No	Yes	Yes	Yes
Additional Controls	Yes			
Number of Subjects	592	449	57	56
Mean Allocation before PLS	$48.08	$48.22	$48.21	$46.71
% of subjects with "$0" reported savings	0.13	0.15	0.12	0.05

Notes to Table 6:
1 - Additional controls are dummy variables for age, education, marital status, employment status, reported saving levels, and born place of subjects. These are summarized in Table2.
2 - Robust standard errors clustered by subjects are in parentheses. 3 -The base case in columns 2 and 3 is *bad PLS odds, bad lottery odds* and *5 percent interest rate.* 4- * $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table 7: Continuous Budget Set

Panel A: Full Sample

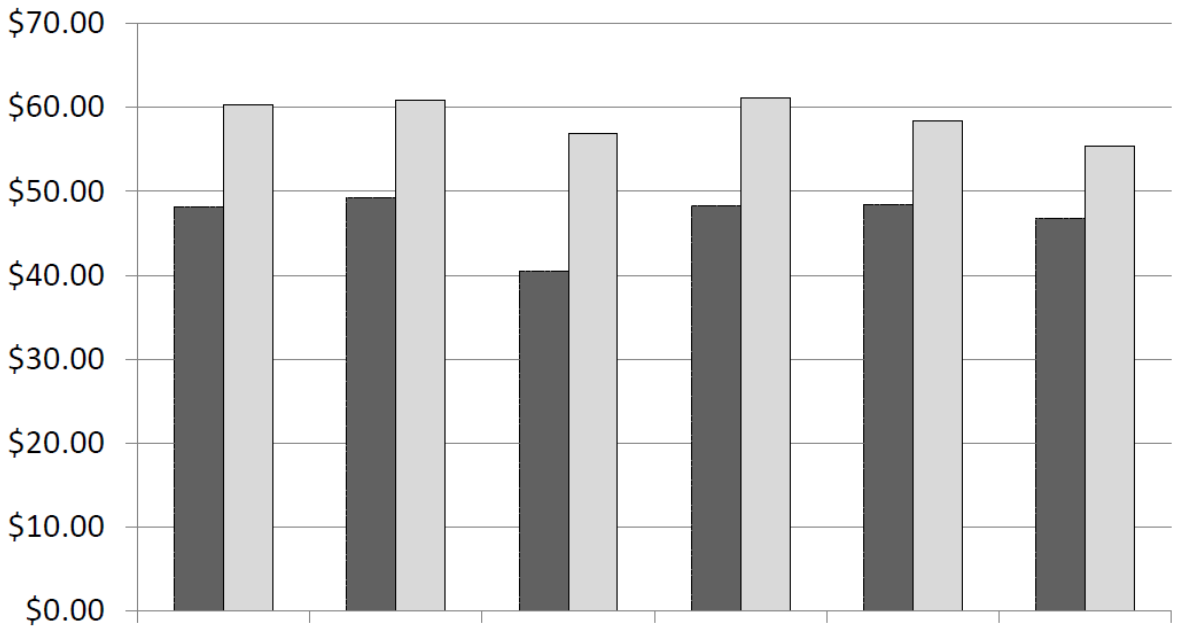
	Total Savings					
		Probit		**Consumption**	**Lottery Expenditure**	**Traditional Savings**
	OLS	Coefficients	Marginal Effects	OLS	OLS	OLS
PLS introduced	9.25***	0.20***	0.03	-4.10***	-5.14***	-7.10***
	(0.68)	(0.05)		(0.55)	(0.50)	(0.81)
Fair PLS odds	-0.69**	0.01	0.00	0.78***	-0.04	-1.43***
	(0.29)	(0.03)		(0.27)	(0.21)	(0.30)
Good PLS odds	1.12***	0.06**	0.01	-0.75***	-0.37	-2.18***
	(0.28)	(0.02)		(0.22)	(0.24)	(0.35)
Fair lottery odds	-0.45**	0.01	0.00	-0.03	0.44***	-0.68***
	(0.23)	(0.02)		(0.19)	(0.26)	(0.23)
Good lottery odds	-1.47***	-0.00	-0.00	-0.85***	2.28***	-2.57***
	(0.31)	(0.02)		(0.22)	(0.29)	(0.35)
20% interest rate	8.05***	0.20	0.03	-6.56	-1.48***	8.90***
	(0.55)	(0.04)		(0.51)	(0.25)	(0.60)
Adjusted R^2	0.83			0.85	0.69	0.80
Number of Subjects				737 (13,266 Observations)		
Mean Allocation before PLS	62.36			25.57	12.07	62.36

Panel B: *Restricted Sample – Individuals with reported savings of $0*

PLS introduced	8.90***	0.27**	0.06	-3.64*	-5.23***	-4.76**
	(2.26)	(0.13)		(2.09)	(1.72)	(1.78)
Fair PLS odds	0.54	-0.06	-0.01	0.80	-1.32*	-0.42
	(0.88)	(0.07)		(0.93)	(0.66)	(0.89)
Good PLS odds	2.66***	0.06	0.01	-1.47*	-1.19*	-1.42
	(0.90)	(0.05)		(0.86)	(0.63)	(1.37)
Fair lottery odds	0.14	-0.03	-0.01	0.13	-0.27	-0.70
	(0.76)	(0.03)		(0.81)	(0.68)	(0.68)
Good lottery odds	-0.02	0.02	0.00	-2.17	2.24***	-0.96
	(1.01)	(0.04)		(0.98)	(0.84)	(1.01)
20% interest rate	6.52	0.18*	0.04	-6.24***	-0.23	6.52***
	(1.90)	(0.10)		(1.87)	(0.68)	(1.73)
Adjusted R^2	0.79			0.81	0.71	0.84
Number of Subjects /Observations				84 (1,512 Observations)		
Mean Allocation before PLS	41.72			43.67	14.61	41.72
Fixed Effects	Yes	No		Yes	Yes	Yes
Additional Controls		Yes				

Notes to Table 7:
1-Sample characteristics are described in Appendix Table 1.
2-Additional controls are dummy variables for age, education, marital status, employment status, reported saving levels, and born place of subjects.
3 - Robust standard errors clustered by subjects are in parentheses.
4- The base case is *bad PLS odds, bad lottery odds* and *10 percent interest rate.*
5- * $p<0.1$, ** $p<0.05$, *** $p<0.01$

FIGURE 1- Mean Total Savings Before and After the Introduction of PLS



	All	Reported Savings >$0	Rep. Saving = $0	MTurk	SR8	SR12
Before	$48.09	$49.26	$40.56	$48.22	$48.42	$46.71
After	$60.33	$60.86	$56.89	$61.18	$58.43	$55.38
Δ%	25%	24%	40%	27%	21%	19%

TABLE A1:
Participation Decision before PLS introduction

Percent of participants who allocated all budget to only	
Consumption	9.2%
Traditional Savings	22.3%
Lottery	3.9%
Percent of participants who allocated positive amounts to	
Consumption & Traditional Savings	13.3%
Consumption & Lottery	8.6%
Traditional Savings & Lottery	15.8%
All three	26.9%

Notes to Table A1:
1-Table reports the allocation decisions of the participants for the first nine decisions where PLS has not been introduced.

Table A2 –DESCRIPTIVE CHARACTERISTICS of Continuous Budget Experiment

Gender	
Male	0.43
Female	0.57
Age	
18-25	0.17
26-45	0.59
46-65	0.15
Over 65	0.09
Marital Status	
Single	0.43
Married	0.50
Divorced	0.07
Education	
Less than High School	0.01
High School	0.38
Bachelor's degree	0.47
Technical	0.01
Postgraduate	0.14
Employment	
Full-time	0.46
Part-time	0.19
Unemployed	0.16
Retired	0.04
Other	0.15
Born in the USA	0.94
Reported Saving	
$0	0.11
$1-$1,000	0.43
$1,001-$2,000	0.13
$2,001-$5,000	0.08
$5,001-$10,000	0.08
$10,001-$30,000	0.06
Over $30,000	0.11
N	737

Lottery Expenditure	
$0	0.41
$1-$150	0.53
>$150	0.06
Gambling	
Never	0.41
Other	0.59
Financial Risk Profile	
Safe	0.68
Neutral	0.15
Risky	0.17
Relative Wealth	
Much worse off	0.11
Somewhat worse off	0.35
About the same as others	0.33
Somewhat better off	0.19
Much better off	0.02