Prize linked savings: Experimental results

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Poor and savings

- Lusardi, Schneider and Tufano (2011) found that half of the US respondents would be unable to come up with $2,000 if an unexpected emergency arose, and that two-thirds of respondents in the lowest income bracket had less than $2,000 in savings.
- Poor save proportionally less when compared to rich. (Mullainathan and Shafir, Banerjee and Duflo)
- On average in US the lottery expenditure was $540 per year per individual. Especially Poor on average spend more on lotteries (Mullainathan and Shafir, Kearney et al 2011).
- Question: How do you nudge people (esp. the poor) to save more? Can you use the attractiveness of lottery to nudge people to save more?

Prize linked savings (PLS)

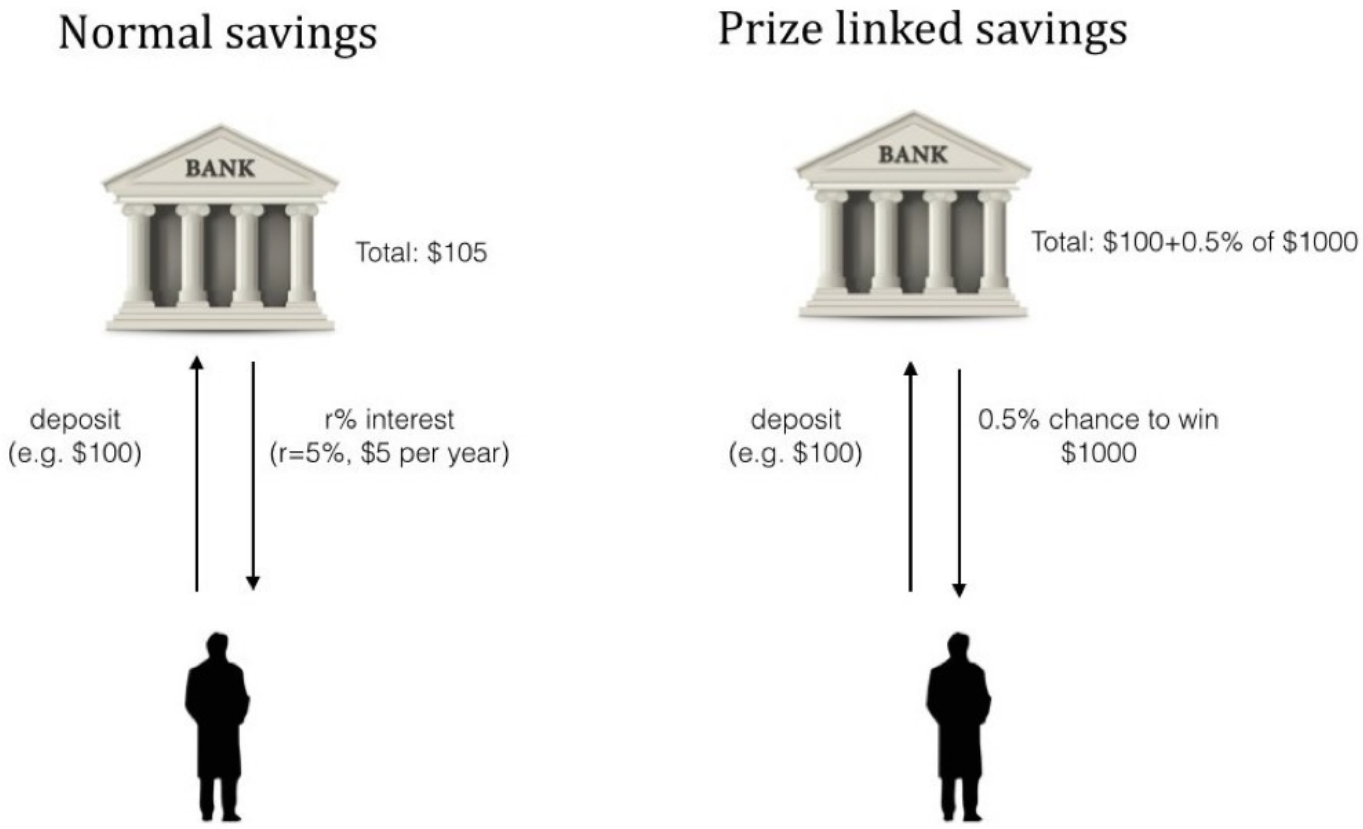

Figure : Prize linked savings

PLS mechanism

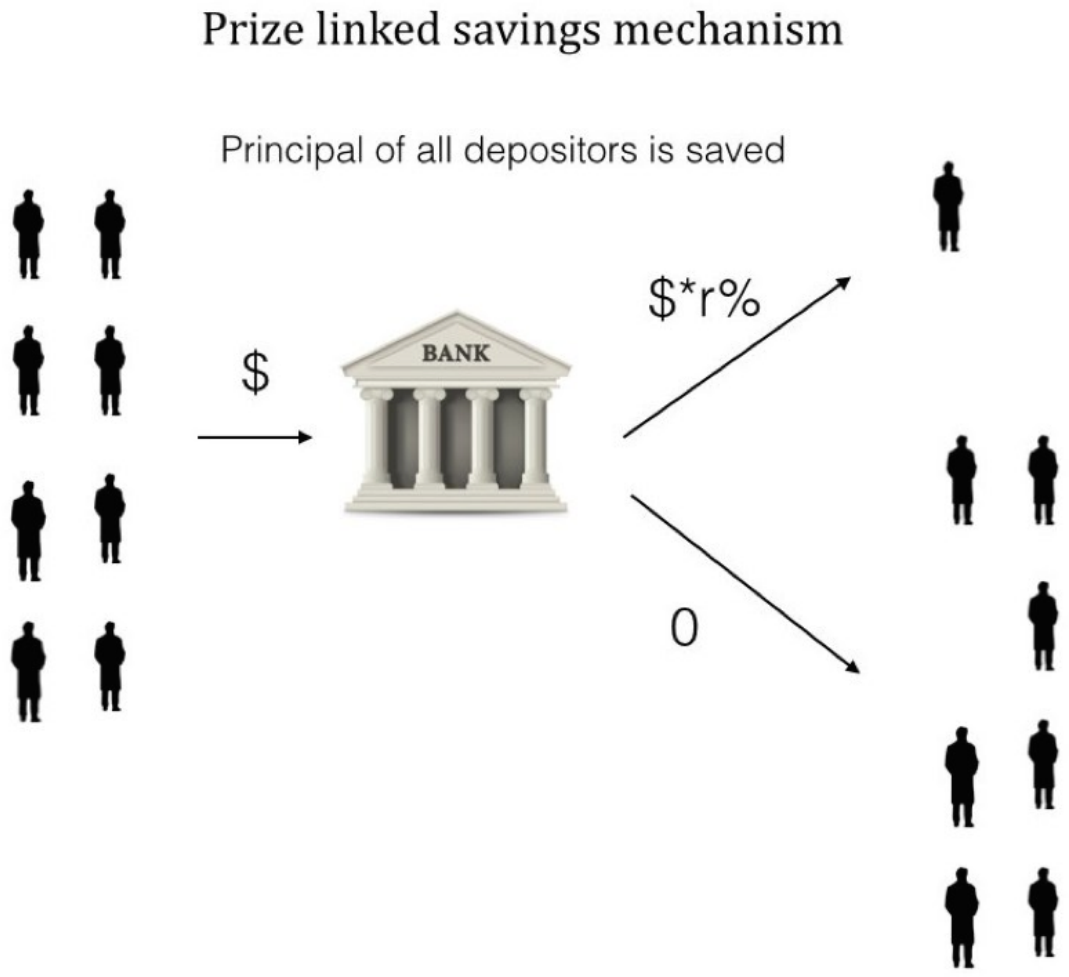

Figure : PLS mechanism

Why is PLS interesting?

- The lottery like aspect of PLS could appeal to lottery players, gamblers and people with low savings account balance.
- In PLS, the principal of the depositor is secured. Only the interest payment is risky. In other words, in PLS, the interest from the savings account is used to purchase a ticket to the lottery. So essentially PLS secures and saves the principal.
- Since PLS offers a chance to receive a large amount through savings, it could potentially appeal to poor/ low income household, who are looking for means to come out of the debt trap.

Why is PLS interesting?

- PLS like products have been used historically popular in South Africa (MaMa savings account) and South America. Even some popular UK bonds have PLS like characteristics.
- USA, Canada and other countries are formulating legislations to allow PLS.
- Psychologically PLS could be used as a tool to understand the role of uncertainty and social influence on savings.
- The insights got from understanding PLS, could help us understand (and design) other products where the lottery feature plays a role.

Research on PLS (Field studies)

PLS has been less researched. There are only 5 Empirical papers in Economics literature that have studied PLS.

- Tufano (2008): The paper analyses UK bonds that have PLS like characteristic. The paper shows that i. Both gambling and saving motives play a role in purchase of UK PLS bonds. ii. Demand for PLS positively correlated with demands for lotteries
- Cole et al (2014): This is a field study on MaMa PLS scheme in South Africa. i. PLS did not cannibalise on other savings.ii. PLS is substitute for lottery.
- Cookson (2014): Analyzed the introduction of PLS in a Nebraska district. The following are the findings: i. Woman preferred PLS more than men. ii. People who are rich seems to prefer PLS (not clear).

Research on PLS (Experiments)

- Ozbay et al (2013): A laboratory experiment on PLS. The following are the findings: i. PLS increases deferred payment; ii. Discounted Cumulative prospect theory model estimation.
- Atalay et al (2013): A portfolio allocation experiment to test the demand for PLS. Results from an online experiment show that the introduction of PLS accounts increase total savings and reduce lottery expenditures significantly.

Research gap

- It is not clear if PLS increases savings among poor or rich.
- The psychological mechanism that drives the demand for PLS is not well understood.
- The long run impact of PLS is not researched. Is the lottery aspect of PLS just a marketing technique or does PLS inherently appeal to the people. How do winners and losers behave?
- Is PLS a substitute for lottery and savings? The evidence is mixed and not clear.
- PLS as a tool to understand role of social influence and uncertainty on savings

Pilot experiment

- **Objective:** To understand the drivers of PLS demand, especially the role of wealth/poverty on PLS demand.
  - Shape of probability weighting function and PLS demand.
  - Role of present bias (or anti-savings motive) in PLS demand.
  - Concreteness in PLS demand
- The pilot experiment was conducted on online platform called social sci. 160 subjects participated in the study.
- 80 subjects were very low income ($<$ \$ 25k per year) and 80 subjects were high income ($>$ \$ 50 k).

Pilot experimental design

- The subjects had to answer questions in three sections
  - Section 1: Choice list was used to elicit subject's preferences for prospects over time. The demand for PLS now, later, the discount rate and the probability weights of the subjects were elicited.
  - Section 2: Portfolio allocation task. Subject was given $100 and asked to allocate between consumption today, lottery, savings and PLS. The subject's relative preference and substitution between products was elicited.
  - Section 3: Demographic characteristics of subjects, self reported risk, impatience and status was measured.

Pilot experiment design

- **Concreteness condition:** In Section II half of the subjects were allocated to concreteness condition. In concreteness condition, the subject was made to write what he will do with the money he wins. Then he was asked to allocate money between lottery, PLS and savings.
- **Incentive:** A flat incentive of $3 was paid to the subjects. The subjects also had a chance to earn money between $ 1 and $ 100 based on their choice.
- Dominance, attention and comprehension check to eliminate subjects. 26 subjects were eliminated leaving 134 for final analysis.

Section I-choice list stimuli

Question 4/16: Which would you like to choose? (Option A: option on the left, Option B: option on the right)

	Option A	Option B	
Today: $ 20 for sure	○	○	In 2 weeks: $ 21 for sure
Today: $ 20 for sure	○	○	In 2 weeks: $ 22 for sure
Today: $ 20 for sure	○	○	In 2 weeks: $ 23 for sure
Today: $ 20 for sure	○	○	In 2 weeks: $ 24 for sure
Today: $ 20 for sure	○	○	In 2 weeks: $ 25 for sure
Today: $ 20 for sure	○	○	In 2 weeks: $ 26 for sure
Today: $ 20 for sure	○	○	In 2 weeks: $ 27 for sure
Today: $ 20 for sure	○	○	In 2 weeks: $ 28 for sure
Today: $ 20 for sure	○	○	In 2 weeks: $ 29 for sure
Today: $ 20 for sure	○	○	In 2 weeks: $ 30 for sure

Figure : Choice list question on PLS

Section I-choice list stimuli

Question 6/16: Which would you like to choose? (Option A: option on the left, Option B: option on the right)

	Option A	Option B	
Today: $ 20 for sure	○	○	In 2 weeks: $ 120 with 1% chance and $20 with 99% chance
Today: $ 20 for sure	○	○	In 2 weeks: $ 120 with 2% chance and $20 with 98% chance
Today: $ 20 for sure	○	○	In 2 weeks: $ 120 with 3% chance and $20 with 97% chance
Today: $ 20 for sure	○	○	In 2 weeks: $ 120 with 4% chance and $20 with 96% chance
Today: $ 20 for sure	○	○	In 2 weeks: $ 120 with 5% chance and $20 with 95% chance
Today: $ 20 for sure	○	○	In 2 weeks: $ 120 with 6% chance and $20 with 94% chance
Today: $ 20 for sure	○	○	In 2 weeks: $ 120 with 7% chance and $20 with 93% chance
Today: $ 20 for sure	○	○	In 2 weeks: $ 120 with 8% chance and $20 with 92% chance
Today: $ 20 for sure	○	○	In 2 weeks: $ 120 with 9% chance and $20 with 91% chance
Today: $ 20 for sure	○	○	In 2 weeks: $ 120 with 10% chance and $20 with 90% chance

Figure : Choice list question on PLS

Section I - questions

In Section I questions, we measured discount rate for

- Sure amount of money received in 2 weeks.
- Medium probability medium outcome PLS received in 2 weeks vs money today
- Low probability high outcome PLS received in 2 weeks vs money today.
- 3 choice lists to measure PLS demand in future and present.
- 8 Choice lists to measure the probability weighting function and the utility function of prospect theory.

Section II- allocation stimuli

Question 2: You have $100, how much money would you like to allocate to each of the decisions below?

Saving account with a 10% interest rate for 4 weeks: For every **$1** you save, 4 weeks later you will receive your principal of **$1** and an extra interest of **$0.1**, in total **$ 1.1**.

Prize linked savings: For every **$1** you allocate to prize linked savings, a) four weeks later you receive your principal **$1** and b) there is a **0.01% chance** to win **$1000** at the same time your principal will be paid to you.

Amount you wish to receive tomorrow	0
Amount you wish to save for 4 weeks	0
Amount you wish to spend on PLS	0
Total	0

Figure : Allocation question

Section II - questions

4 questions, Allocation to

- Lottery vs Savings vs Consumption.
- Lottery vs PLS vs Consumption.
- Savings vs PLS vs Consumption.
- After Concreteness manipulation : PLS vs Lottery vs Savings vs Consumption.

Results I (PLS Demand)

Poor	Consumption	lottery	Saving	PLS
No	31.9	11.9	39.9	42
Yes	37.53	10.8	42.6	34
Total	34.5	11.4	41.17	38.3

Table : Mean allocation to different options (poor and non-poor)

Low prob. PLS	% increase in subjects who chose later option	
Poor	**PLS now**	**PLS in future**
No	13.8%	11.1%
Yes	16.3%	21.3%
Total	15.07%	15.7%

Table : Mean discount rate lowered by PLS (poor and non-poor)

Results II (Concreteness and gender)

Concreteness	Consumption	lottery	Saving	PLS
No	36	42.2	10.99	35.99
Yes	32.95	40.1	11.85	40.77
Total	34.5	41.17	11.42	38.34

Table : Mean allocation to different options (concreteness and non concreteness)

Gender	Mean PLS allocation
Male	32.6
Female	42.7

Table : Gender and PLS on mean PLS allocation

Results III (probability weighting and substitution)

Probability weighting w(p)	p=0.01	p=0.05	p=0.1	p=0.2	p>0.3
PLS Demand	0.27**	0.15**	0.09**	0.04*	NS

Table : PLS and probability weighting

	PLS replaces lottery	PLS replaces savings
Change in consumption	Decrease (-8.85)**	Decrease (-1.12)
Allocation to PLS	Increase (+20)**	Increase (+2)

Table : PLS - effect on consumption

**-significant at $\alpha = 0.05$, *- significant at $\alpha = 0.1$

Summary of the results

- There is a significant demand for PLS.
- The demand for PLS is more among rich than poor. And more among woman than men.
- The appeal of PLS is mostly driven by the overweighting of small probabilities, so small probability large outcome PLS have a better demand. Hyperbolic factor plays no role.
- PLS substitutes lottery but not savings. It lowers consumption today when it substitutes gambling.
- Making the utility of money concrete increases PLS demand but not significantly.
- Higher demand for PLS among self reported lottery player and people of lower perceived status.

Insights and future ideas

- Using PLS as a tool to study the effect of social influence on savings behavior
- The influence of uncertainty/ gamification on savings behavior.
- This project is at a very early stage. We would like to shape the existing idea or develop new ideas based on PLS with applications to marketing. Any comments on this would be very helpful.
- Finally to design a product that would nudge poor to save more.