Can Partial Commitment Increase Pension Contribution? A Field Experiment in Sri Lanka

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Motivation

- Global ageing is the result of a decrease in both mortality and fertility.
  - By 2050, the number of people aged 60 and over will have doubled from 11% in 2009 to 22% (UN 2010).
- In developing countries, a large share of the population depends on the informal sector, which has less access to pension.
  - In Sri Lanka, informal sector employment accounts for about 59.8 percent (Department of Census and Statistics 2015).
- Defined contribution plans, such as micropensions, can potentially provide informal sectors with old age security

Motivation

- What is micropension?
  - A fixed system of contributions where participants can save voluntarily over a long period.
  - The built up savings are invested by a professional asset manager
  - At a pre determined age, the built-up assets can be collected as a lump sum, in phases or on a monthly basis as an annuity.
- However, the participation rate is low:
  - About 20% after 10 years in Sri Lanka

Motivation

- Defined Contribution (DC) plans are widespread over the world.
  - US: 14.9 trillions assets in individual retirement accounts and DC plans by 2016 (Investment Company Institute 2017)
  - About 60% of total retirement assets.
- Tradeoff in pension design: flexibility vs commitment(Amador, Werning and Angeletos 2006)
  - Commitment helps to secure retirement savings but lacks of flexibility with negative shock
  - Flexibility might lead to high leakage of pension system
  - For every $1 that flows into US retirement savings system $0.40 leaks out (Argento, Bryant, and Sabelhaus 2014)
- How to design pension contract to reduce the leakage while maintaining the participation?
  - Sophisticated present-biased consumers might prefer commitment savings (Amador, Werning and Angeletos 2006)

Motivation

- CPF (Singapore) - Illiquid account
  - Can only withdraw from age 55 onwards, after setting aside Retirement Sum
- 401k (United States) - Partially illiquid account
  - Withdrawals before age 59.5 typically incur a 10% penalty (on top of ordinary income tax) unless an exception applies
- National Pension System (India) - Two accounts: liquid and illiquid
  - Subscribers make voluntary contributions to two accounts
  - Tier I Account: Before age 60, only 20% of the contribution can be withdrawn.
  - Tier II Account: Free to withdraw savings from this account
- Me Daakye (Ghana) - Two accounts: liquid and illiquid
  - Contributions are divided into two equal parts.
  - General Savings Account: allows early withdrawals
  - Retirement Account: not allow early withdrals

Research Design and Main Results

- We conduct a randomized field experiment to study the impact of contract design on the demand of micropensions in Sri Lanka.
  - Randomize two types of incentives: instalment and matching
  - Randomize early withdraw penalty
- Main results:
  - The instalment treatment increases participation rate by about 29 percentage points and increases contribution by about Rs.180
  - The matching treatment is less effective than the instalment treatment
  - Partial illiquid account is more attractive than fully illiquid account with the same penalty.

Contribution

- Demand for pension savings
  - Estimate the price elasticity (Chetty et al 2014)
  - How contract design affects demand pension (Beshears, Choi, Harris, Laibson, Madrian, Sakong 2015)
- Behavioral mechanism design (Amador, Werning and Angeletos 2006;Beshears, Choi, Harris, Laibson, Madrian, Sakong 2015)
  - How to design an optimal mechanism to maximize social utility function, given consumers' Behavioral biases?

Background

The Self-employed Persons Pension Scheme: Surakuma

- Established in 2006 by the Sri Lanka Social Security Board
- Eligibility: Personnel aged 18 to 59 who are not entitled to a government pension
- Voluntary, defined-contribution
- Pensioners contribute N*X Rs monthly before age 60 and will receive a monthly pension of N*Rs.1000 after reaching age 60, until demise
- The return is estimated to be 9%
- 1 USD=180 SLR (Dec 2018)

Background


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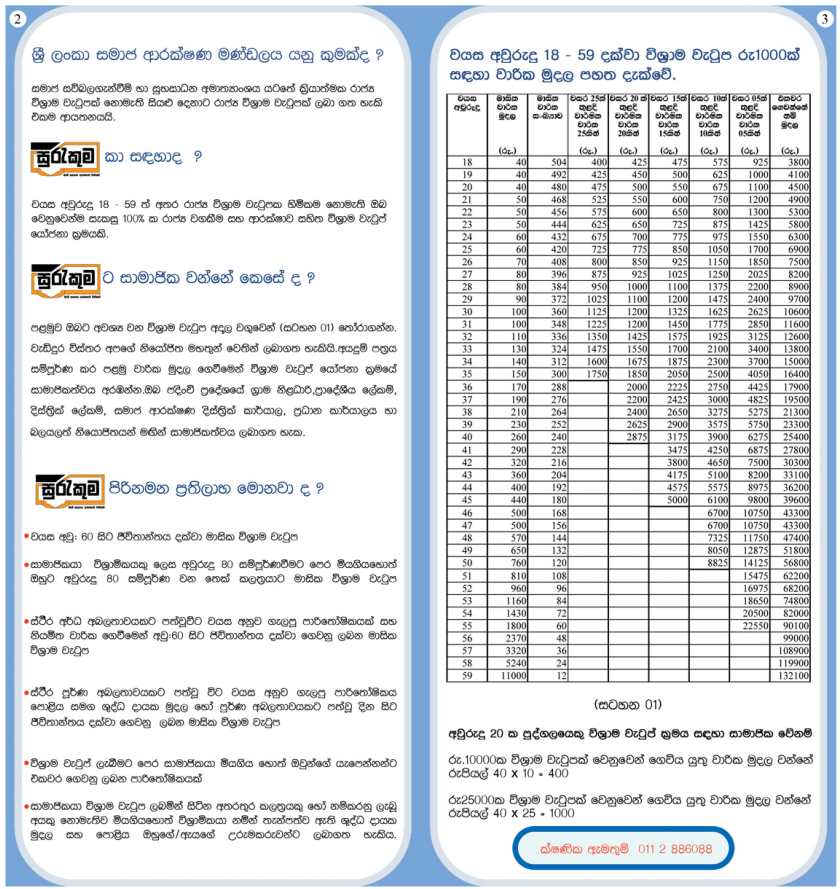
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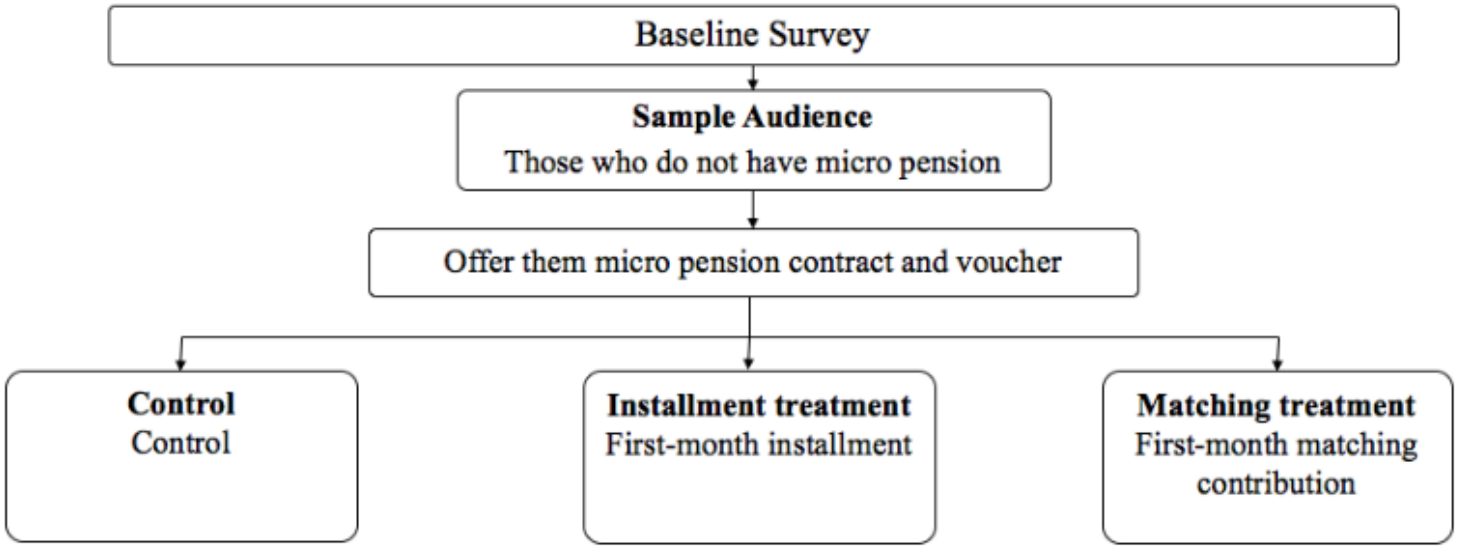
ශ්‍රී ලංකා සමාජ ආරක්ෂණ මණ්ඩලය යනු කුමක්ද ?
සමාජ සවිබලගැන්වීම් හා සුභසාධන අමාත්‍යාංශය යටතේ ක්‍රියාත්මක රාජ්‍ය විශ්‍රාම වැටුපක් නොමැති සියළු දෙනාට රාජ්‍ය විශ්‍රාම වැටුපක් ලබා ගත හැකි එකම ආයතනයයි.
සුරැකුම කා සඳහාද ?
වයස අවුරුදු 18 - 59 ත් අතර රාජ්‍ය විශ්‍රාම වැටුපක හිමිකම නොමැති ඔබ වෙනුවෙන්ම සැකසූ 100% ක රාජ්‍ය වගකීම සහ ආරක්ෂාව සහිත විශ්‍රාම වැටුප් යෝජනා ක්‍රමයකි.
සුරැකුම ට සාමාජික වන්නේ කෙසේ ද ?
පළමුව ඔබට අවශ්‍ය වන විශ්‍රාම වැටුප අදාළ වතුවෙන් (සටහන 01) තෝරාගන්න. වැඩිදුර විස්තර අපගේ නියෝජිත මහතුන් වෙතින් ලබාගත හැකිය.අයදුම් පත්‍රය සම්පූර්ණ කර පළමු වාරික මුදල ගෙවීමෙන් විශ්‍රාම වැටුප් යෝජනා ක්‍රමයේ සාමාජිකත්වය ආරම්භ කිරීම ඔබ පදිංචි ප්‍රදේශයේ ග්‍රාම නිලධාරී,ප්‍රාදේශීය ලේකම්, දිස්ත්‍රික් ලේකම්, සමාජ ආරක්ෂණ දිස්ත්‍රික් කාර්යාල, ප්‍රධාන කාර්යාලය හා බලයලත් නියෝජිතයන් මඟින් සාමාජිකත්වය ලබාගත හැක.
සුරැකුම පිරිනමන ප්‍රතිලාභ මොනවා ද ?
වයස අවු: 60 සිට ජීවිතාන්තය දක්වා මාසික විශ්‍රාම වැටුප
සාමාජිකයා විශ්‍රාමිකයකු ලෙස අවුරුදු 80 සම්පූර්ණවීමට පෙර මියගියාහොත් ඔහුට අවුරුදු 80 සම්පූර්ණ වන තෙක් කලලයාට මාසික විශ්‍රාම වැටුප
ස්ථිර අඩ අබලතාවයකට පත්වූවිට වයස අනුව ගෙලුපු පාරිතෝෂිකයක් සහ නියමිත වාරික ගෙවීමෙන් අවු:60 සිට ජීවිතාන්තය දක්වා ගෙවනු ලබන මාසික විශ්‍රාම වැටුප
ස්ථිර පූර්ණ අබලතාවයකට පත්වූ විට වයස අනුව ගෙලුපු පාරිතෝෂිකය පොළිය සමඟ ඉදිරි දායක මුදල හෝ පූර්ණ අබලතාවයකට පත්වූ දින සිට ජීවිතාන්තය දක්වා ගෙවනු ලබන මාසික විශ්‍රාම වැටුප
විශ්‍රාම වැටුප් ලැබීමට පෙර සාමාජිකයා මියගිය හොත් ඔවුන්ගේ යැපෙන්නන්ට එකවර ගෙවනු ලබන පාරිතෝෂිකයක්
සාමාජිකයා විශ්‍රාම වැටුප ලබමින් සිටින අතරතුර කලලයකු හෝ නම්කරනු ලැබූ අයකු නොමැතිව මියගියහොත් විශ්‍රාමිකයා නම්න් පැන්පත්ව ඇති ඉදිරි දායක මුදල සහ පොළිය ඔහුගේ/අයගේ උරුමකරුවන්ට ලබාගත හැකිය.
3
වයස අවුරුදු 18 - 59 දක්වා විශ්‍රාම වැටුප රු1000ක් සඳහා වාරික මුදල පහත දැක්වේ.
වයස අවුරුදු | මාසික වාරික මුදල (රු.) | මාසික වාරික සංඛ්‍යාව | වසර 25ක් තුළදී වාරික වාරික 25කින් (රු.) | වසර 20 ක් තුළදී වාරික වාරික 20කින් (රු.) | වසර 15ක් තුළදී වාරික වාරික 15කින් (රු.) | වසර 10ක් තුළදී වාරික වාරික 10කින් (රු.) | වසර 05ක් තුළදී වාරික වාරික 05කින් (රු.) | එකවර ගෙවන්නේනම් ගෙවිය යුතු මුදල (රු.)
18 | 40 | 504 | 400 | 425 | 475 | 575 | 925 | 3800
19 | 40 | 492 | 425 | 450 | 500 | 625 | 1000 | 4100
20 | 40 | 480 | 475 | 500 | 550 | 675 | 1100 | 4500
21 | 50 | 468 | 525 | 550 | 600 | 750 | 1200 | 4900
22 | 50 | 456 | 575 | 600 | 650 | 800 | 1300 | 5300
23 | 50 | 444 | 625 | 650 | 725 | 875 | 1425 | 5800
24 | 60 | 432 | 675 | 700 | 775 | 975 | 1550 | 6300
25 | 60 | 420 | 725 | 775 | 850 | 1050 | 1700 | 6900
26 | 70 | 408 | 800 | 850 | 925 | 1150 | 1850 | 7500
27 | 80 | 396 | 875 | 925 | 1025 | 1250 | 2025 | 8200
28 | 80 | 384 | 950 | 1000 | 1100 | 1375 | 2200 | 8900
29 | 90 | 372 | 1025 | 1100 | 1200 | 1475 | 2400 | 9700
30 | 100 | 360 | 1125 | 1200 | 1325 | 1625 | 2625 | 10600
31 | 100 | 348 | 1225 | 1200 | 1450 | 1775 | 2850 | 11600
32 | 110 | 336 | 1350 | 1425 | 1575 | 1925 | 3125 | 12600
33 | 130 | 324 | 1475 | 1550 | 1700 | 2100 | 3400 | 13800
34 | 140 | 312 | 1600 | 1675 | 1875 | 2300 | 3700 | 15000
35 | 150 | 300 | 1750 | 1850 | 2050 | 2500 | 4050 | 16400
36 | 170 | 288 | | 2000 | 2225 | 2750 | 4425 | 17900
37 | 190 | 276 | | 2200 | 2425 | 3000 | 4825 | 19500
38 | 210 | 264 | | 2400 | 2650 | 3275 | 5275 | 21300
39 | 230 | 252 | | 2625 | 2900 | 3575 | 5750 | 23300
40 | 260 | 240 | | 2875 | 3175 | 3900 | 6275 | 25400
41 | 290 | 228 | | | 3475 | 4250 | 6875 | 27800
42 | 320 | 216 | | | 3800 | 4650 | 7500 | 30300
43 | 360 | 204 | | | 4175 | 5100 | 8200 | 33100
44 | 400 | 192 | | | 4575 | 5575 | 8975 | 36200
45 | 440 | 180 | | | 5000 | 6100 | 9800 | 39600
46 | 500 | 168 | | | | 6700 | 10750 | 43300
47 | 500 | 156 | | | | 6700 | 10750 | 43300
48 | 570 | 144 | | | | 7325 | 11750 | 47400
49 | 650 | 132 | | | | 8050 | 12875 | 51800
50 | 760 | 120 | | | | 8825 | 14125 | 56800
51 | 810 | 108 | | | | | 15475 | 62200
52 | 960 | 96 | | | | | 16975 | 68200
53 | 1160 | 84 | | | | | 18650 | 74800
54 | 1430 | 72 | | | | | 20500 | 82000
55 | 1800 | 60 | | | | | 22550 | 90100
56 | 2370 | 48 | | | | | | 99000
57 | 3320 | 36 | | | | | | 108900
58 | 5240 | 24 | | | | | | 119900
59 | 11000 | 12 | | | | | | 132100
(සටහන 01)
අවුරුදු 20 ක පුද්ගලයෙකු විශ්‍රාම වැටුප් ක්‍රමය සඳහා සාමාජික වේනම්
රු.10000ක විශ්‍රාම වැටුපක් වෙනුවෙන් ගෙවිය යුතු වාරික මුදල් වන්නේ රුපියල් 40 x 10 = 400
රු25000ක විශ්‍රාම වැටුපක් වෙනුවෙන් ගෙවිය යුතු වාරික මුදල් වන්නේ රුපියල් 40 x 25 = 1000
ක්ෂණික ඇමතුම් 011 2 886088

Example of Pension Contract									
Age	Monthly Installment	Quarterly Installment	Annual installment (25 years)	Annual installment (20 years)	Annual installment (15 years)	Annual installment (10 years)	Annual installment (5 years)	Lump-sum installment	Monthly pension
18	40	100	400	425	475	575	925	3800	1000

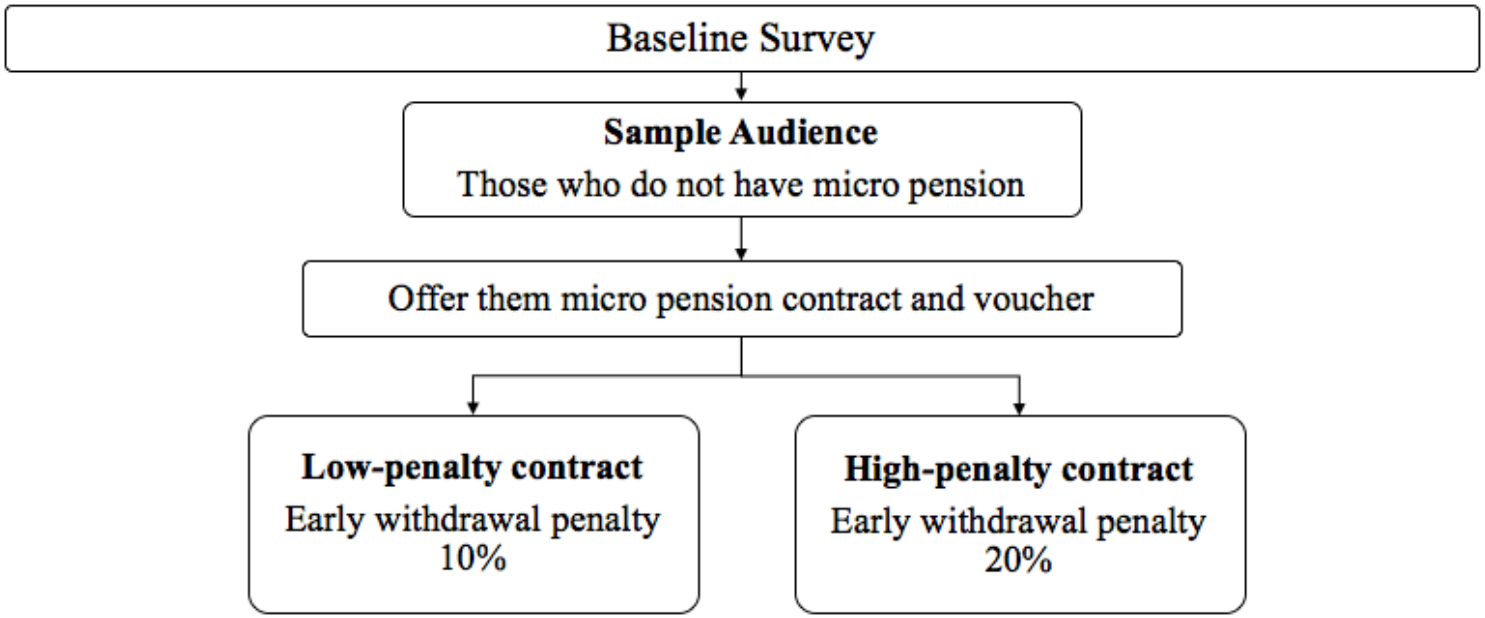
An example:

- A self-employed 18 year old
- Can choose to make monthly, quarterly, annual, or lump-sum installment, according to the table above
- After reaching age 60, he is entitled to receive a monthly pension of Rs. 1000 until his demise

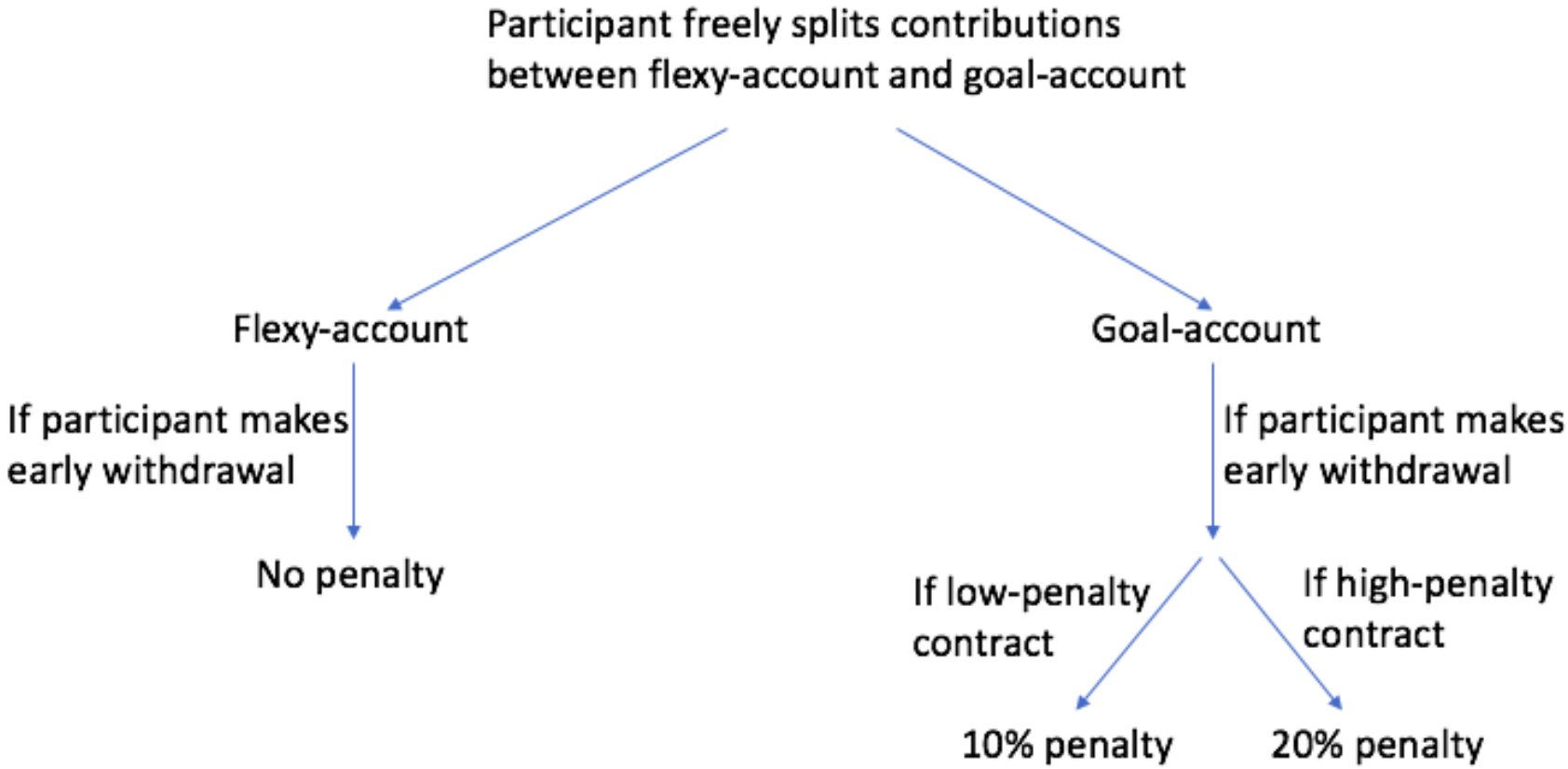
Experimental Design 1: Randomization of voucher



Experimental Design 1: Randomization of contract



Contract treatment



Conditional on participation, the allocation to Goal account implies demand for commitment since both accounts provide the same return.

Low Penalty Contract

Your contribution will be allocated to two accounts in the micropension. You will decide what proportion to allocate to each account.

Account (Flexy)

The **Flexy Account** is designed to let you access your money whenever you want. Whatever amount you put into this account, you **can withdraw freely** anytime.

Account (Goal)

The **Goal Account** is designed to help you to save for retirement. If you withdraw money from the Goal Account, there will be **10% withdraw penalty of the amount you withdraw**. The withdraw penalty will help you avoid temptation to spend your money before retirement.

For example,

	Flexy Account	**Goal Account**
Puts in	800 Rs	200 Rs
Withdraws	-100	-100
Withdraw penalty	0	(10% x-100) = -10Rs
Remainder	700 Rs in Account	100 Rs in Account
	100 Rs cash	90 Rs in cash

High Penalty Contract

Your contribution will be allocated to two accounts in the micropension. You will decide what proportion to allocate to each account.

Flexy Account	The **Flexy Account** is designed to let you access your money whenever you want. Whatever amount you put into this account, you **can withdraw freely** anytime.
Goal Account	The **Goal Account** is designed to help you to save for retirement. If you withdraw money from the Goal Account, there will be **20% withdraw penalty of the amount you withdraw**. The withdraw penalty will help you avoid temptation to spend your money before retirement.

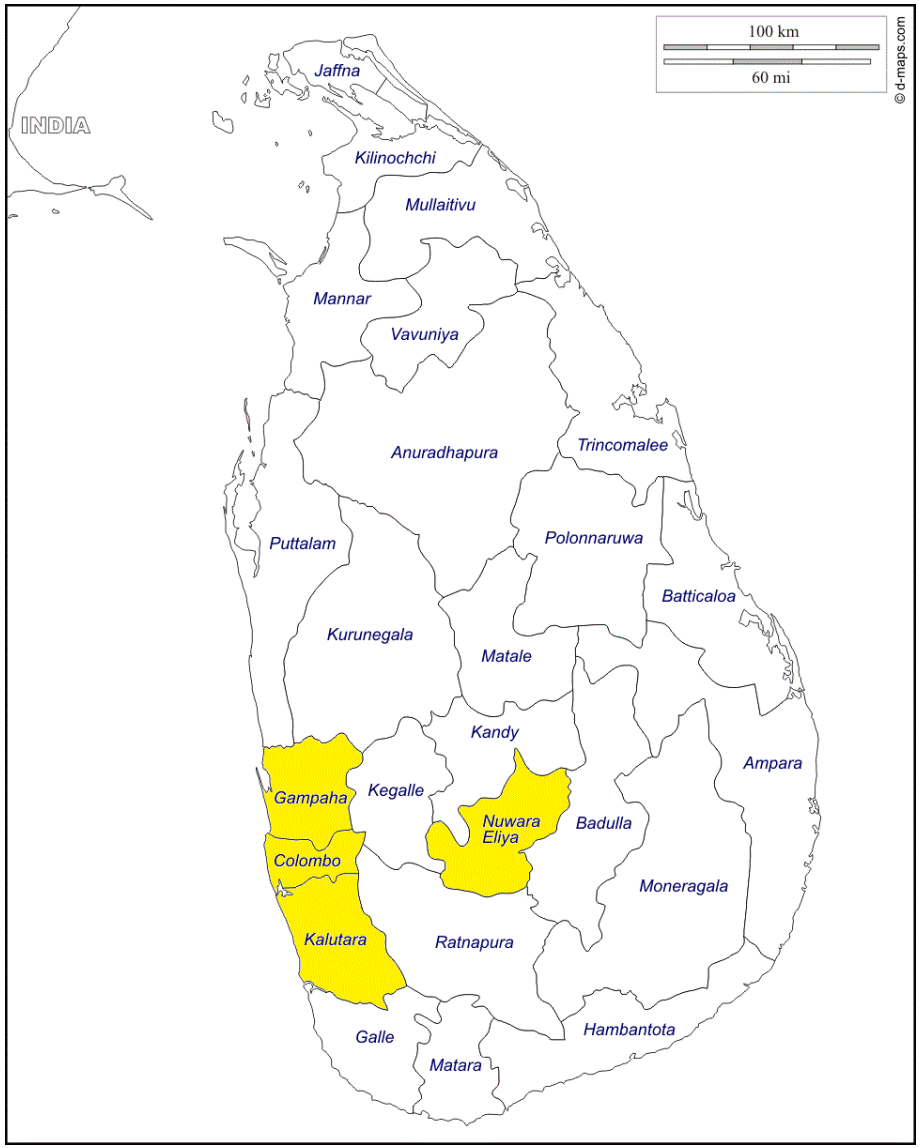
For example,

	Flexy Account	**Goal Account**
Puts in	800 Rs	200 Rs
Withdraws	-100	-100
Withdraw penalty	0	(20% x-100) = -20Rs
Remainder	700 Rs in Account	100 Rs in Account
	100 Rs cash	80 Rs in cash

Research Design

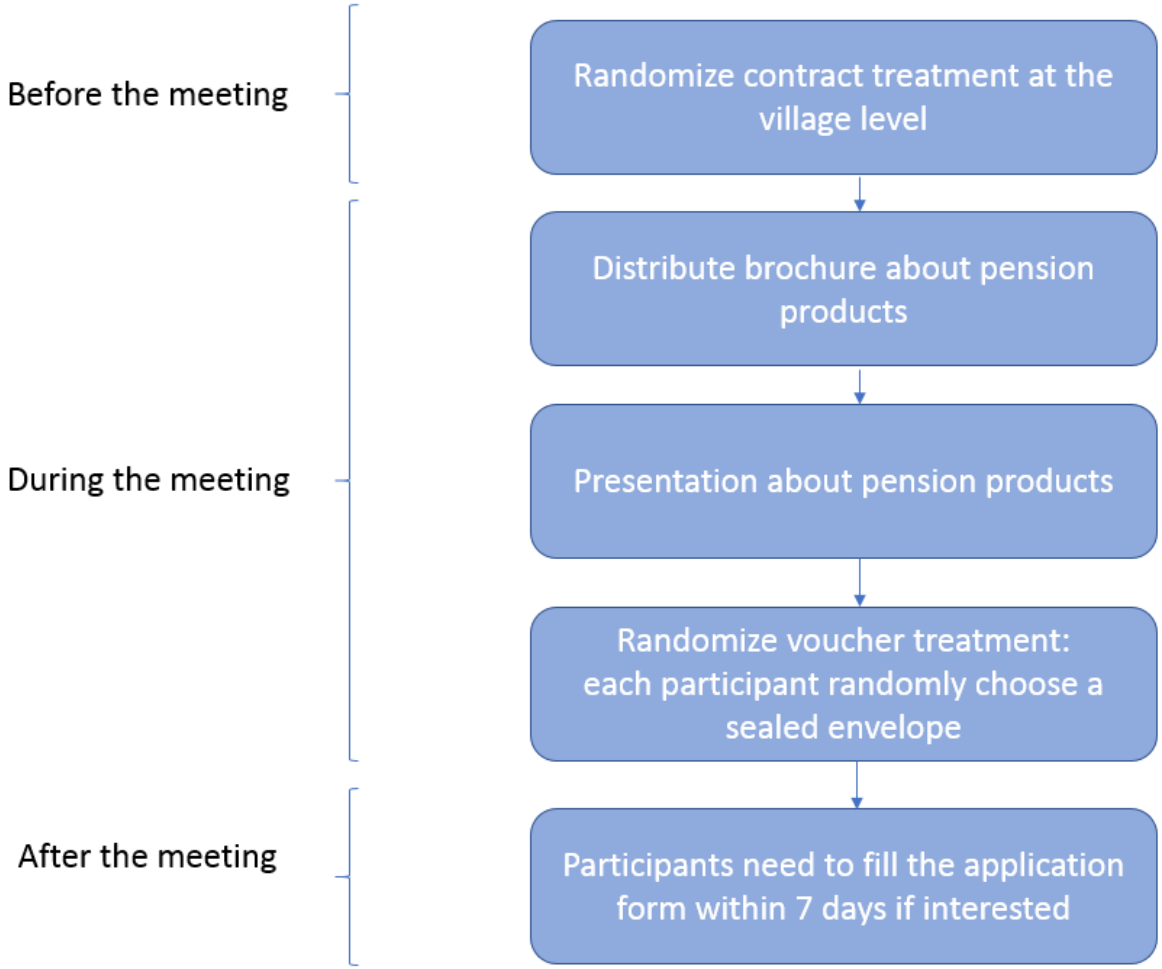
- Partner: the Sri Lanka government and NGO SEEDS
  - SEEDS has more than 1000 village Societies
  - SEEDS has 250,000 clients saving and 128,447 clients borrowing
- We randomly select 200 villages in four districts in Sri Lanka: Colombo, Kaluthara, Gampaha, and Nuwara Eliya

Reserach Design



Research Design

In each village, SEEDS contacts village leaders to arrange awareness meetings for micropension product.

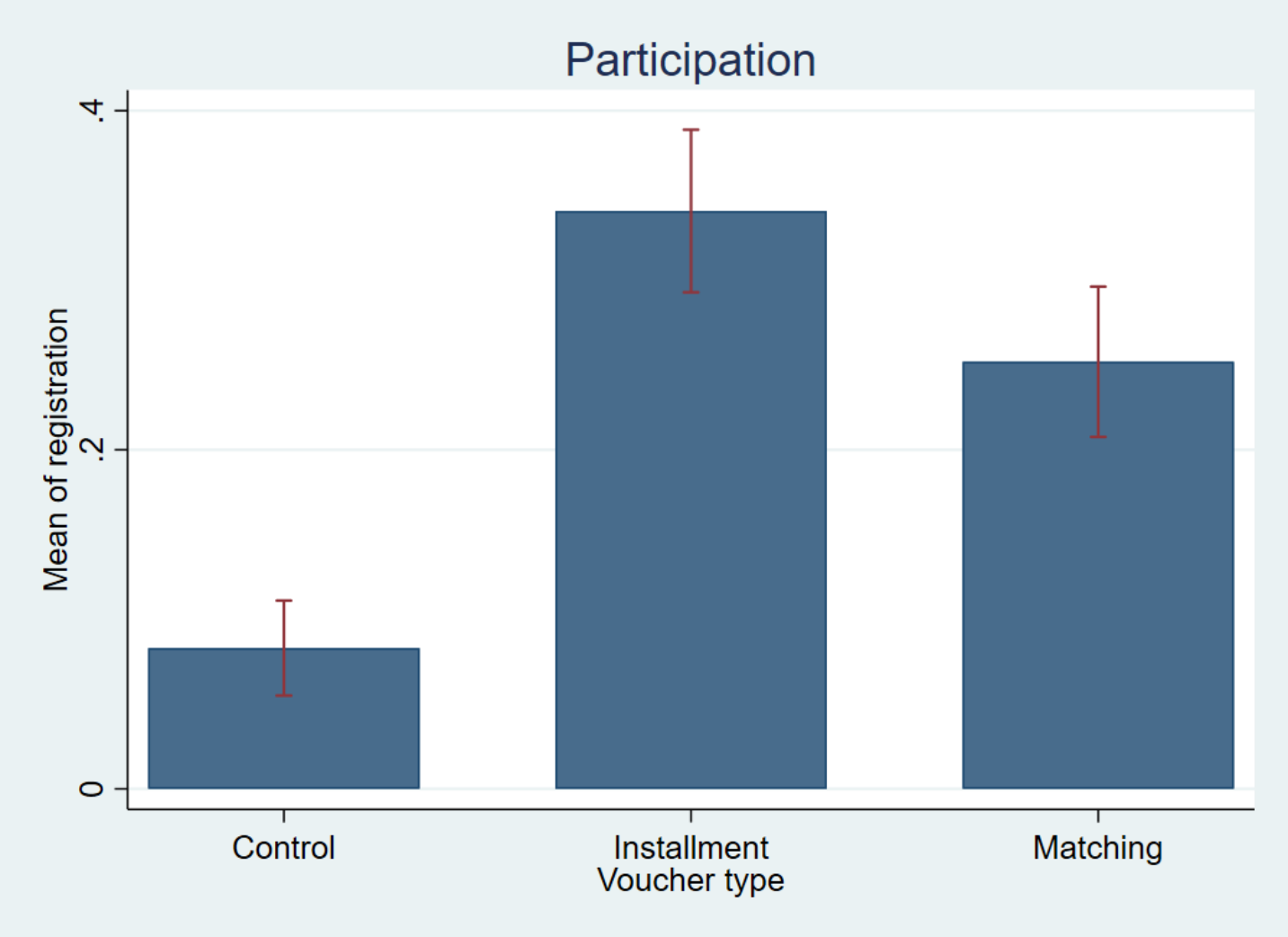


Summary statistics

	Control	Instalment	Matching	Total	p-value
Male	0.21	0.21	0.24	0.22	0.54
	(0.41)	(0.41)	(0.43)	(0.41)	
Age	41.12	39.54	40.72	40.46	0.20
	(10.34)	(10.70)	(10.58)	(10.55)	
Primary education	0.57	0.58	0.60	0.59	0.84
	(0.50)	(0.49)	(0.49)	(0.49)	
Monthly income: below 20K (SLR)	0.52	0.49	0.52	0.51	0.85
	(0.50)	(0.50)	(0.50)	(0.50)	
Monthly income: 20K to 40K (SLR)	0.39	0.39	0.38	0.39	0.95
	(0.49)	(0.49)	(0.49)	(0.49)	
Sinhalese	0.89	0.86	0.89	0.88	0.45
	(0.31)	(0.35)	(0.31)	(0.33)	
Difficult to cover daily expense	0.26	0.22	0.23	0.24	0.52
	(0.44)	(0.42)	(0.42)	(0.43)	
Trust government on pension	0.85	0.81	0.84	0.83	0.46
	(0.35)	(0.39)	(0.37)	(0.37)	
Probability to live until age 75	65.36	64.50	64.45	64.77	0.79
	(16.96)	(17.44)	(17.52)	(17.29)	
Present bias	0.08	0.11	0.10	0.10	0.59
	(0.28)	(0.31)	(0.30)	(0.30)	
Sophisticate	0.08	0.08	0.07	0.08	0.84
	(0.26)	(0.28)	(0.25)	(0.26)	

Results: Participation

Participation (by voucher)



The Installment treatment raised participation rate by about 26 percentage points,

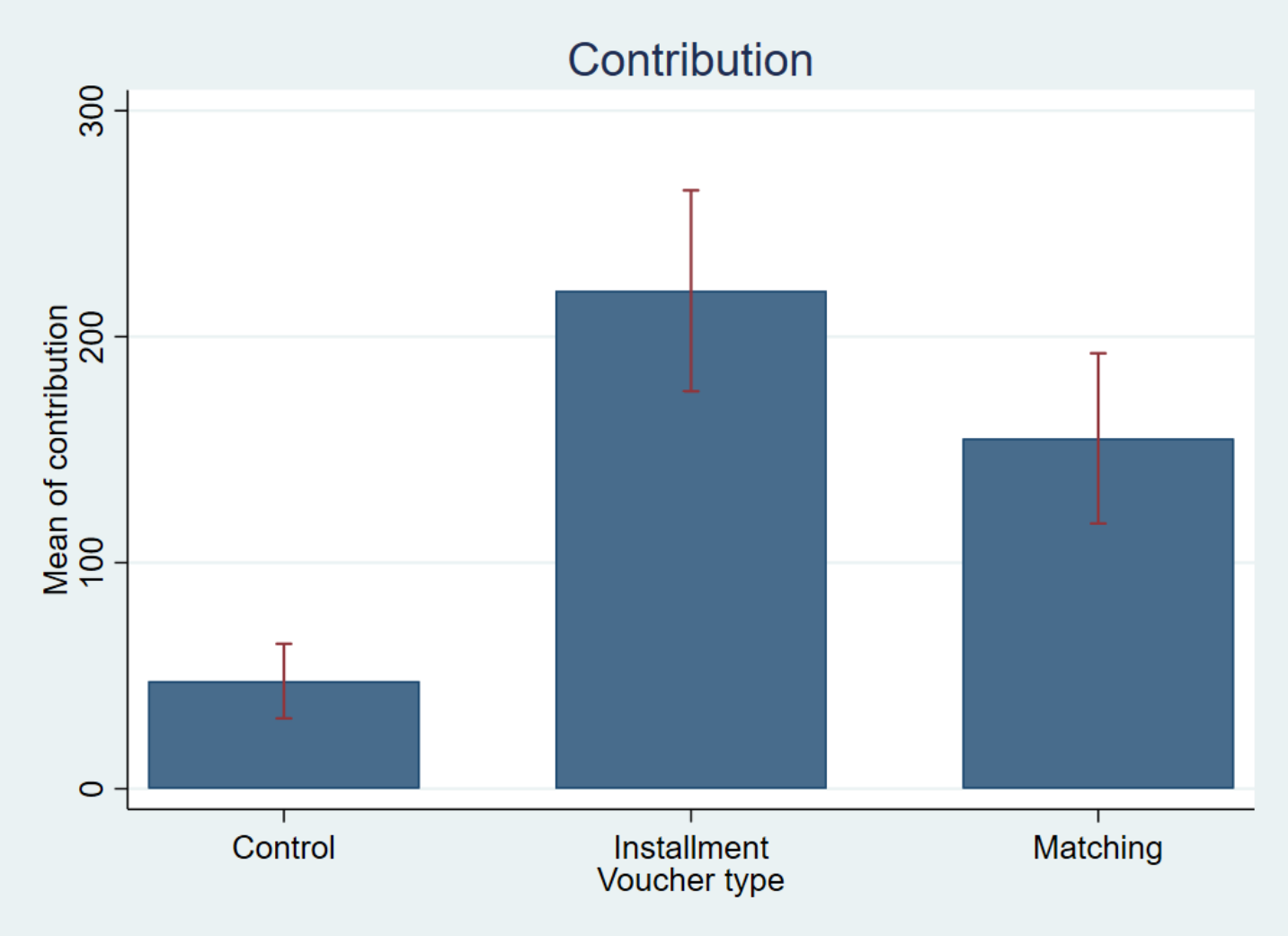
Results: Participation

Participation (by contract)

High penalty contract reduces the participation rate by about 2 percentage points

Results: Contributions

Contribution (by voucher)



The Instalment treatment raised monthly contribution by about Rs.180, whereas the

Results: Contributions

Contribution (by contract)

High penalty contract reduces the contribution by about Rs. 40

Results

	(1) Participation	(2) Contribution	(3) Contribution	(4) Goal account %	(5) Goal account %
Installment	0.288***	181.420***	9.851	24.696***	3.442
	(0.040)	(24.831)	(59.466)	(2.632)	(6.882)
Matching	0.194***	128.600***	-4.524	17.497***	3.277
	(0.043)	(23.665)	(73.274)	(2.563)	(6.890)
Adjusted R^2	0.353	0.322	0.409	0.375	0.418
Mean of Dep. Var. (Control)	0.083	47.623	556.000	6.302	83.500
Installment = Match (p-value)	0.005	0.063	0.837	0.010	0.973
Meeting Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	794	794	163	794	163

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Columns 1, 2 and 4 use the whole sample, while columns 3 and 5 use the subsample of pension participants

Results

	(1) Participation	(2) Contribution	(3) Contribution	(4) Goal account %	(5) Goal account %
High penalty	-0.020	-47.303	-179.178	-3.312	-6.412
	(0.047)	(44.420)	(126.767)	(4.209)	(6.078)
Adjusted R^2	0.086	0.057	0.126	0.112	0.055
Mean of Dep. Var. (Low penalty)	0.236	162.638	688.617	20.251	85.745
Observations	794	794	179	794	179

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Columns 1, 2 and 4 use the whole sample, while columns 3 and 5 use the subsample of pension participants

Heterogeneous effects

- The effect is stronger for those who are younger, have high life expectancy (probability to live up to age 75)
- There is no heterogeneous effect with respect to gender, eduction, financial literacy, or trust in the government to handle their savings

Possible Explanations

- Why is the instalment treatment more effective than the matching treatment?
  - Liquidity constraint
  - Present bias: the first payment is in the second month in the instalment treatment

Possible Explanations

	(1) Liquidity Constraint	(2) Participation	(3) Contribution
Installment	0.023	0.254***	142.021***
	(0.116)	(0.043)	(35.514)
Matching	-0.013	0.188***	124.717***
	(0.120)	(0.044)	(33.421)
High penalty	-0.087	0.121	92.261
	(0.075)	(0.128)	(76.954)
Installment X Liquidity Constraint		0.068	77.918
		(0.062)	(49.877)
Matching X Liquidity Constraint		0.014	9.275
		(0.061)	(50.695)
Liquidity Constraint		-0.042	-25.814
		(0.043)	(31.364)
Adjusted R^2	0.045	0.353	0.321
Mean of Dep. Var. (Control)	0.500	0.083	47.623
Meeting Fixed Effects	Yes	Yes	Yes
Observations	179	794	794

Standard errors in parentheses

Possible Explanations

Hypothetical questions to measure individual time preference

35) If you were given the following choices, would you choose option (1) or (2)?

	Option (1)	Option (2)	Your choice
A	Gain 10000 SLR today	Gain 10630 SLR in one year	
B	Gain 10000 SLR today	Gain 11880 SLR in one year	
C	Gain 10000 SLR today	Gain 13130 SLR in one year	
D	Gain 10000 SLR today	Gain 14370 SLR in one year	
E	Gain 10000 SLR today	Gain 15630 SLR in one year	
F	Gain 10000 SLR today	Gain 16880 SLR in one year	

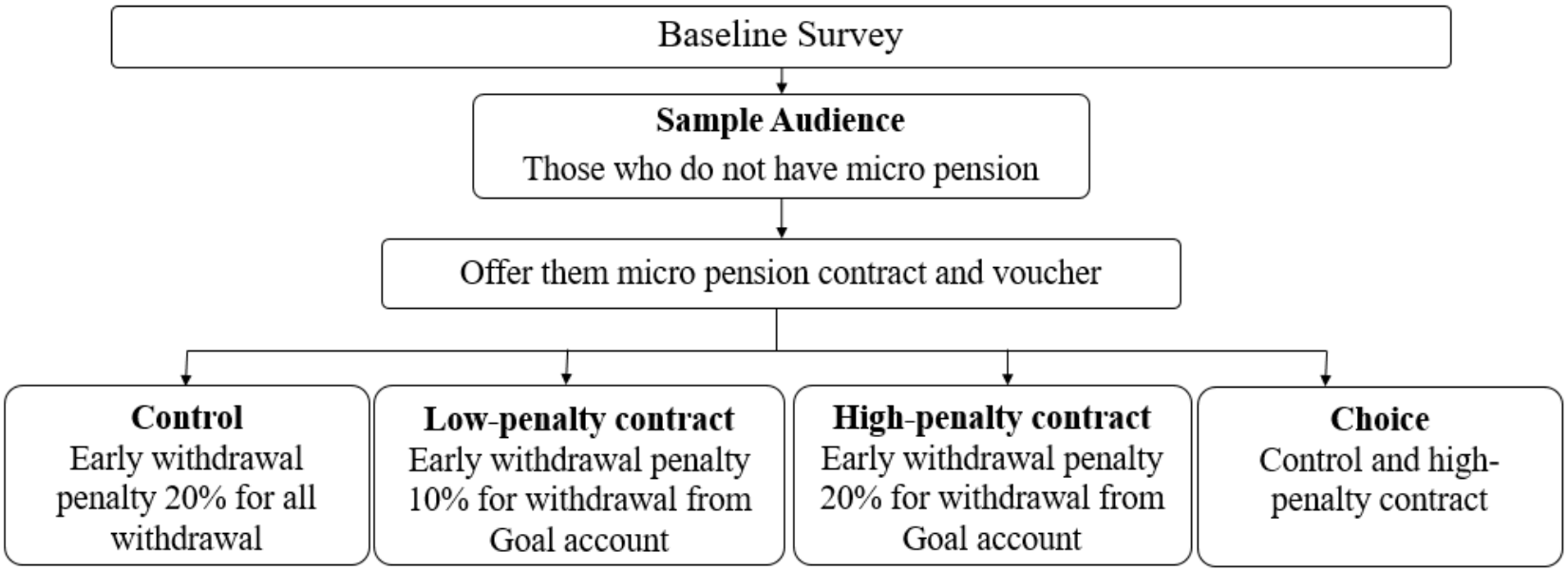
36) If you were given the following choices, would you choose option (1) or (2)?

	Option (1)	Option (2)	Your choice
A	Gain 10000 SLR in 2 years	Gain 10630 SLR in 3 years	
B	Gain 10000 SLR in 2 years	Gain 11880 SLR in 3 years	
C	Gain 10000 SLR in 2 years	Gain 13130 SLR in 3 years	
D	Gain 10000 SLR in 2 years	Gain 14370 SLR in 3 years	
E	Gain 10000 SLR in 2 years	Gain 15630 SLR in 3 years	
F	Gain 10000 SLR in 2 years	Gain 16880 SLR in 3 years	

Possible Explanations

	(1) Present bias	(2) Participation	(3) Contribution
Installment	0.160**	0.265***	153.569***
	(0.063)	(0.031)	(24.344)
Matching	0.029	0.203***	131.466***
	(0.055)	(0.031)	(24.001)
High penalty	-0.020	0.124	98.409
	(0.052)	(0.130)	(78.433)
Present bias		-0.056	-77.831
		(0.075)	(82.177)
Installment X Present bias		0.218**	270.175**
		(0.108)	(110.423)
Matching X Present bias		-0.080	-11.960
		(0.099)	(98.170)
Adjusted R^2	0.016	0.359	0.332
Mean of Dep. Var. (Control)	0.045	0.083	47.623

Experimental Design 2: Randomisation of contract

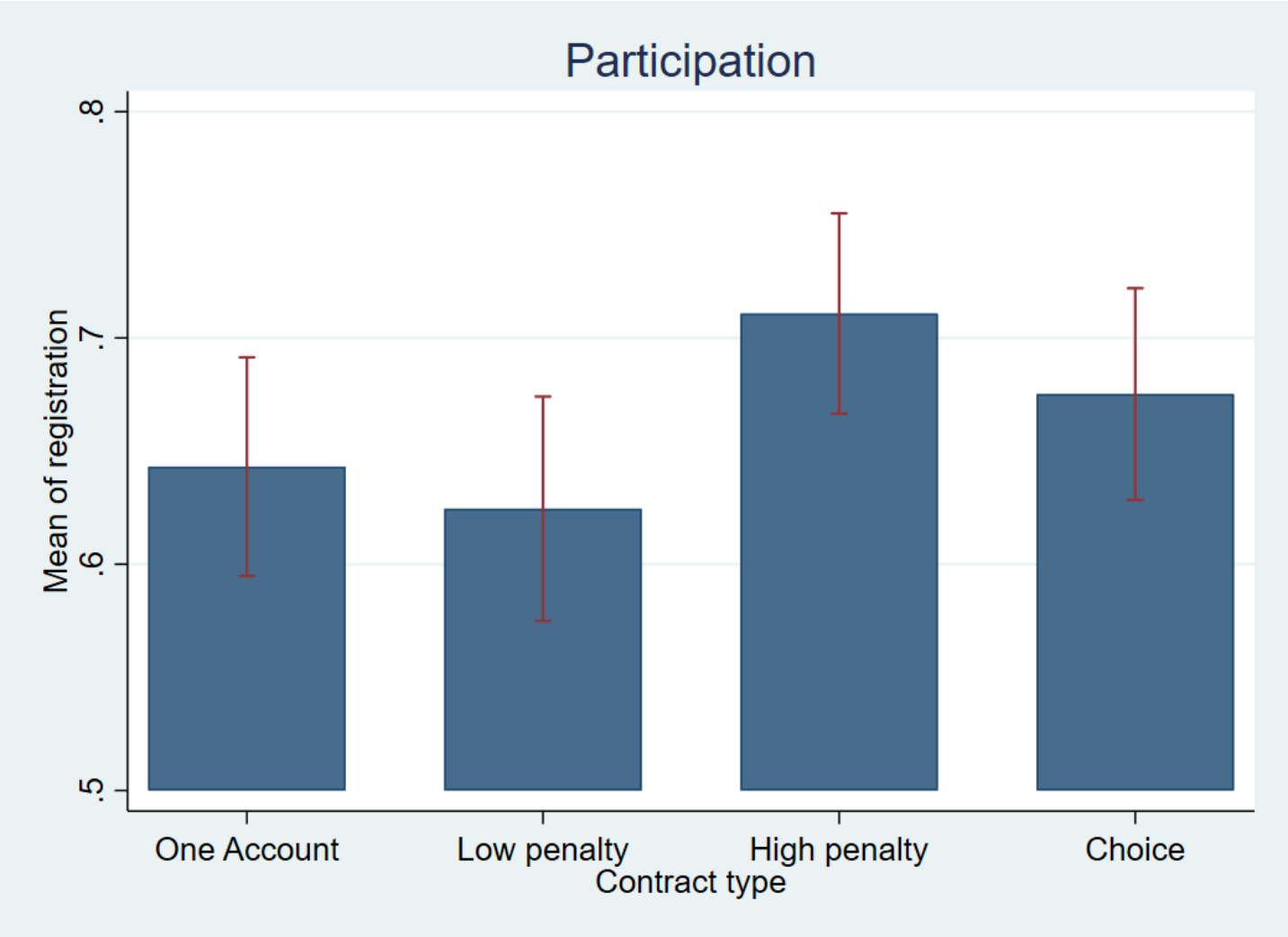


Summary statistics

	One account	Two account low penalty	Two account high penalty	Choice	Total	p-value
Male	0.42	0.45	0.44	0.43	0.43	0.88
	(0.49)	(0.50)	(0.50)	(0.50)	(0.50)	
Age	31.48	33.26	32.25	32.21	32.29	0.26
	(9.13)	(11.12)	(10.41)	(9.71)	(10.12)	
Primary education	0.72	0.64	0.71	0.78	0.71	0.00
	(0.45)	(0.48)	(0.45)	(0.41)	(0.45)	
Monthly income: below 20K (SLR)	0.34	0.37	0.42	0.39	0.38	0.27
	(0.48)	(0.48)	(0.49)	(0.49)	(0.49)	
Monthly income: 20K to 40K (SLR)	0.57	0.56	0.49	0.51	0.53	0.23
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	
Sinhalese	0.77	0.81	0.79	0.74	0.78	0.31
	(0.42)	(0.39)	(0.40)	(0.44)	(0.41)	
Difficult to cover daily expense	0.33	0.31	0.33	0.34	0.33	0.96
	(0.47)	(0.47)	(0.47)	(0.47)	(0.47)	
Trust government on pension	0.83	0.81	0.80	0.80	0.81	0.75
	(0.37)	(0.39)	(0.40)	(0.40)	(0.39)	
Probability to live until age 75	63.33	64.71	63.29	62.50	63.44	0.27
	(13.91)	(12.88)	(12.72)	(13.33)	(13.22)	
Present bias	0.16	0.15	0.18	0.16	0.16	0.78
	(0.36)	(0.36)	(0.39)	(0.37)	(0.37)	
Sophisticate	0.14	0.13	0.15	0.15	0.14	0.92
	(0.35)	(0.34)	(0.35)	(0.36)	(0.35)	
Number of meeting	30	32	31	31	123	
Obs	269	261	287	274	1091	

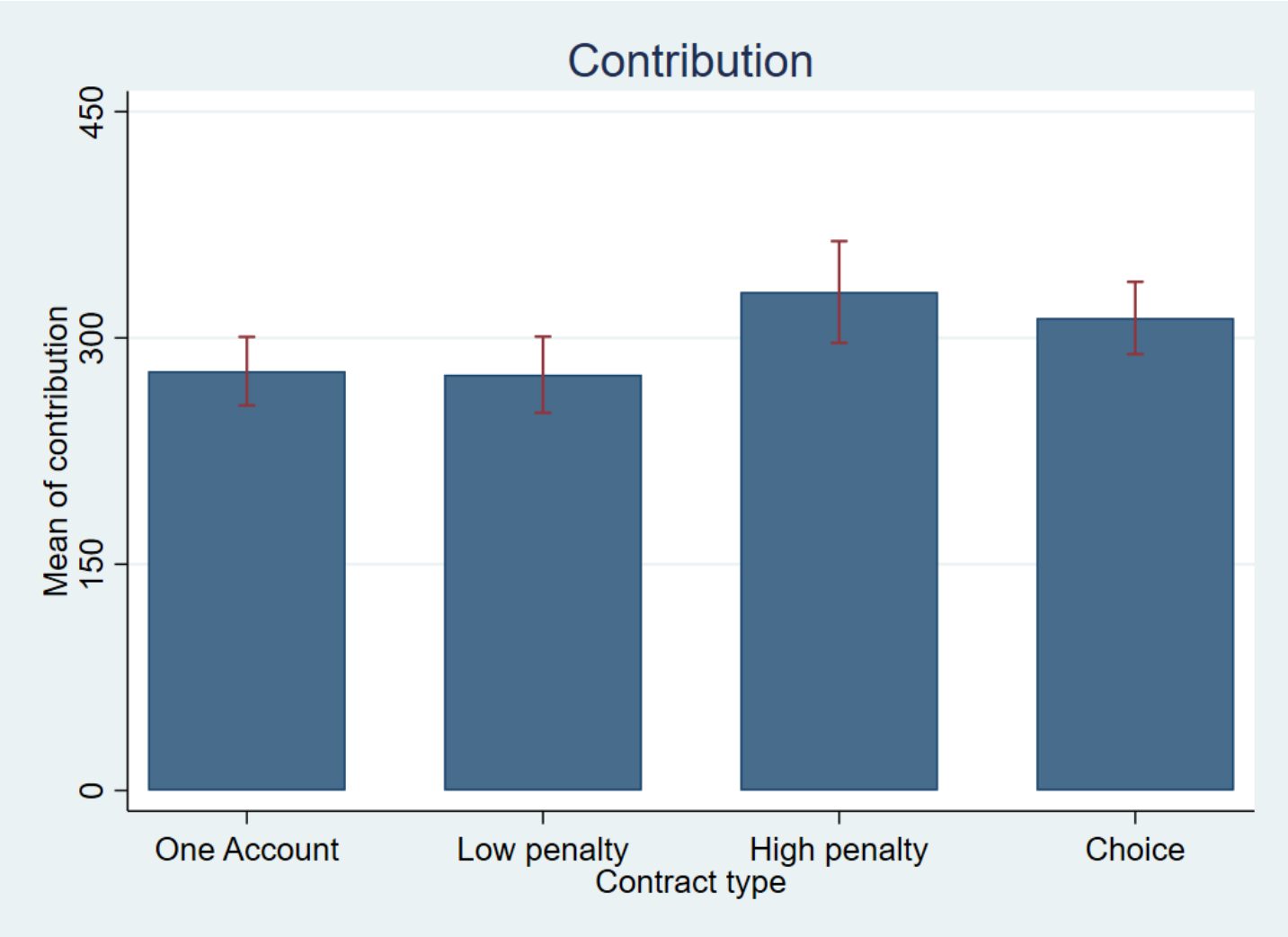
Results: Registration

Contribution (by contract)



Results: Contributions

Contribution (by contract)



Results

	(1) Participation	(2) Contribution	(3) Contribution
Low penalty, equal allocation	0.040	-4.440	-17.437
	(0.049)	(32.346)	(31.642)
High penalty, equal allocation	0.099**	57.093**	14.594
	(0.046)	(26.634)	(25.583)
Choice	0.077*	42.113*	12.169
	(0.040)	(21.453)	(19.035)
Adjusted R^2	0.176	0.103	0.201
Mean of Dep. Var. (One account)	0.643	277.955	432.197
Month Fixed Effects	Yes	Yes	Yes
Observations	1091	1091	725

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Possible Explanations

- Why do participants allocate more contributions to the commitment account under high penalty?
  - Commitment vs Flexibility: Sophisticated present-biased consumers might prefer commitment savings to protect savings from themselves in future
  - Participants prefer commitment savings to protect savings from other people in future
    - Not likely!
    - 89% report that the reason for their future early withdraw is due to children, medical and other emergency
    - 3% report that the reason for their future early withdraw is due to friends and relatives's borrowing or over-spending

Commitment vs Flexibility

Amador, Werning and Angeletos (2006) studies the design of optimal commitment devices in situations where eliminating all choices is not necessarily optimal.

Utility for self-0 from periods t = 1, 2: $E[\theta U(c) + W(k)]$

Utility for self-1 from periods $t = 1, 2$ with taste shock θ:
$\theta U(c) + \beta W(k)$

Predictions:

- Sophisticated agents prefer commitment
- Agents with high temptation (low β) prefer commitment.
- Agents with high taste shock (high θ) prefer commitment.

Possible Explanations

- Hypothetical questions to measure individual sophistication (similar to Ameriks et al. 2007)
  - Suppose you received Rs 10,000 for consumption only within next two months.
  - (1) How do you plan to spend it over next two months under the ideal situation?
  - (2) According to your most accurate self-estimation, how will you spend it over next two month in reality?"
  - (3) Suppose you received Rs 10,000 in a Cheque for consumption only within next two months, Which one do you prefer?
    - a)you can get cash in all in the first month
    - b) you can get the cash according to the ideal plan in question (1) in the first month and the rest in the second month.
- Sophistication: individuals' answers differ in Question (1) and (2), or individuals prefer option (b) in Question (3).

Possible Explanations

	(1) Sophisticate	(2) Participation	(3) Contribution
Low penalty, equal allocation	0.033	0.037	-10.026
	(0.037)	(0.049)	(33.694)
High penalty, equal allocation	0.078*	0.067	28.031
	(0.043)	(0.045)	(30.133)
Choice	0.076	0.031	17.475
	(0.054)	(0.045)	(24.450)
Sophisticate		-0.203**	-100.433**
		(0.092)	(47.768)
Low penalty,equal allocation X Sophisticate		0.037	42.473
		(0.126)	(60.491)
High penalty,equal allocation X Sophisticate		0.241*	205.573**
		(0.131)	(97.072)
Choice X Sophisticate		0.285**	149.509**
		(0.138)	(66.496)
Adjusted R^2	0.035	0.183	0.111
Mean of Dep. Var. (One account)	0.098	0.643	277.955
Month Fixed Effects	Yes	Yes	Yes

Conclusion

- The instalment treatment increases participation rate by 29 percentage points, increases contribution by Rs.180, and goal account contribution percentage by about 25 percentage points
- The matching treatment increases participation rate by 19 percentage points, increases contribution by Rs.100, and goal account contribution percentage by about 17 percentage points
- The matching treatment is less effective than the instalment treatment
- Partial illiquid account is more attractive than fully illiquid account with the same penalty.

Thank you!

Commitment vs Flexibility

- Trust: 84
- benefit: compare to other investment
- understanding about intervention and contract: pilot
- each period a taste shock is realized that affects the individual's desire for current versus future consumption
- taste shocks are privately observed by the individual.

Commitment vs Flexibility

Amador, Werning and Angeletos (2006) studies the design of optimal commitment devices in situations where eliminating all choices is not necessarily optimal. They introduce a value for flexibility and study the resulting trade-off with commitment, defined as the removal of some future choices.
For their model:

- individual suffers from temptation for higher present consumption.
- each period a taste shock is realized that affects the individual's desire for current versus future consumption
- taste shocks are privately observed by the individual.

Commitment vs Flexibility

The optimal commitment problem they study selects a subset of the individual's budget set to maximize ex ante utility, taking into account the ex post temptation problem individuals experience facing that set. The commitment problem does not allow insurance or transfers across taste shocks.

Commitment vs Flexibility

Basic Consumption-Saving Problem:
Two periods and a single consumption good each period.

- Budget set constrain by consumer:
  $B \equiv \{(c,k) \in \mathbb{R}^2_+ | c + k \leq y\}$, where total resource is y
- θ is the taste shock from a bounded set Θ with distribution function $F(\theta)$, normalized so that $E[\theta] = 1$ and $1 - \beta$ is the strength of temptation toward present consumption.
- **Period 0** An initial period in which a commitment mechanism is set up by self-0.
- **Period 1** individuals receive a taste shock θ, consumption c occurs
- **Period 2** consumption k occurs

Utility for self-1 from periods $t = 1, 2$ with taste shock θ:
$\theta U(c) + \beta W(k)$
Utility for self-0 from periods t = 1, 2: $E[\theta U(c) + W(k)]$

Commitment vs Flexibility

Optimal Commitment without Self-Control:
choose $C \in B$:

$$\max \int [\theta U(c(\theta)) + W(k(\theta))] dF(\theta)$$

s.t.

$$(\theta U(c) + \beta W(k)) \geq \theta U(c(\theta')) + \beta W(k(\theta')) \quad (1)$$

$$c(\theta) + k(\theta) \leq y \quad (2)$$

Commitment vs Flexibility

Two and Three Types:

PROPOSITION 1

Suppose $\Theta = \{\theta_l, \theta_h\}, \theta_l < \theta_h. \exists \beta^*$ s.t. for $\beta \in [\beta^*, 1]$ the first best allocation is implementable.

Otherwise:

- $\beta \geq \theta_l/\theta_h$, separation is optimal, i.e. $c^*(\theta_h) > c^*(\theta_l)$ and $k^*(\theta_h) < k^*(\theta_l)$
- $\beta \leq \theta_l/\theta_h$, bunching is optimal, i.e. $c^*(\theta_h) = c^*(\theta_l)$ and $k^*(\theta_h) = k^*(\theta_l)$

In both cases, the optimum can be attained without burning money: $c^*(\theta) + k^*(\theta) = y$ for $\theta = \theta_h, \theta_l$

Commitment vs Flexibility

- First-best allocation is IC for low enough levels of temptation relies on the discrete difference in taste shocks and does not hold with a continuum of shocks.
- The first-best allocation for higher temptation is no longer incentive compatible and the proposition shows that the solution takes one of two forms.
- For intermediate levels of temptation it is optimal to separate the agents.

Minimum Saving:

PROPOSITION 2

An optimal allocation $(\underline{w}, u^8)$ satisfies $u^*(\theta) = u^*(\theta_p)$ for $\theta \geq \theta_p$ where θ_p is the lowest value in Θ s.t.

$$\int_{\hat{\theta}}^{\bar{\theta}} (1 - G(\tilde{\theta}))d\tilde{\theta} \leq 0$$

for $\hat{\theta} \geq \theta_p$.

Commitment vs Flexibility

- For any bounded distribution of taste shocks, a positive mass of upper agents gets the same bundle of consumption and savings, which lies on the budget line.
- A minimum-savings rule that binds for some types has the property that top types are bunched.

Intuition:

Informally, these types can make a case for their preferences. In contrast, self-1 types with $\theta > \beta\bar{\theta}$ display a blatant desire for current consumption from self-0's point of view. i.e., no taste shock of self-0 can justify self-1's preference.

Separating such types requires consumption to increase with θ, but this cannot be optimal since they are over-consuming from self-0's point of view. Thus, these agents should be bunched . i.e., at the very top of the distribution, for $\theta \geq \beta\bar{\theta}$, there is no trade-off between commitment and flexibility.

Agents with high temptation (low β) prefer commitment. Agent with high taste shock (high θ) prefer commitment. The pattern only exist in