

Behavioural Benefits of Credit Transfer: Evidence from an RCT in Bangladesh

Jayanta Sarkar (QUT)

Jinnat Ara (BIDS)

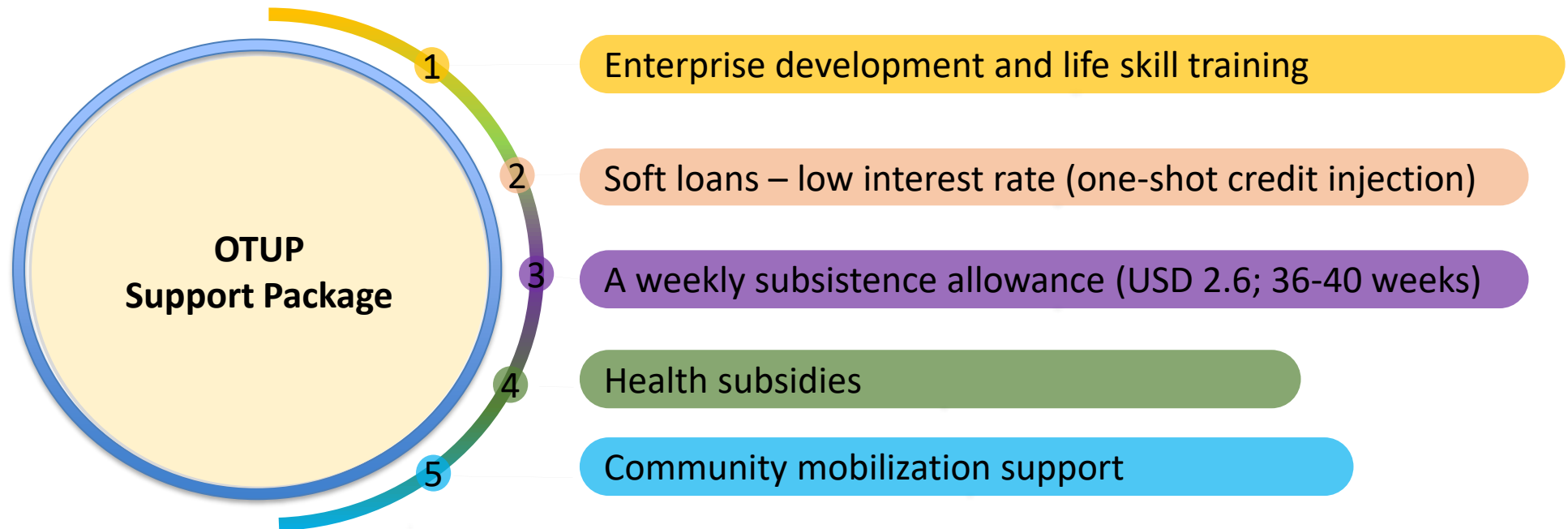
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Broader Research Project

- **Broader project:** Impact evaluation of Bangladesh Rural Advancement Committee’s (BRAC) RCT-based program “**Targeting the Ultra-Poor (TUP)**”
- The program implements two intervention packages:
 - ✓ *Specially Targeted Ultra Poor (STUP) package*, a grant-based support package, and
 - ✓ *Other Targeted Ultra Poor (OTUP) package*, a credit plus support package

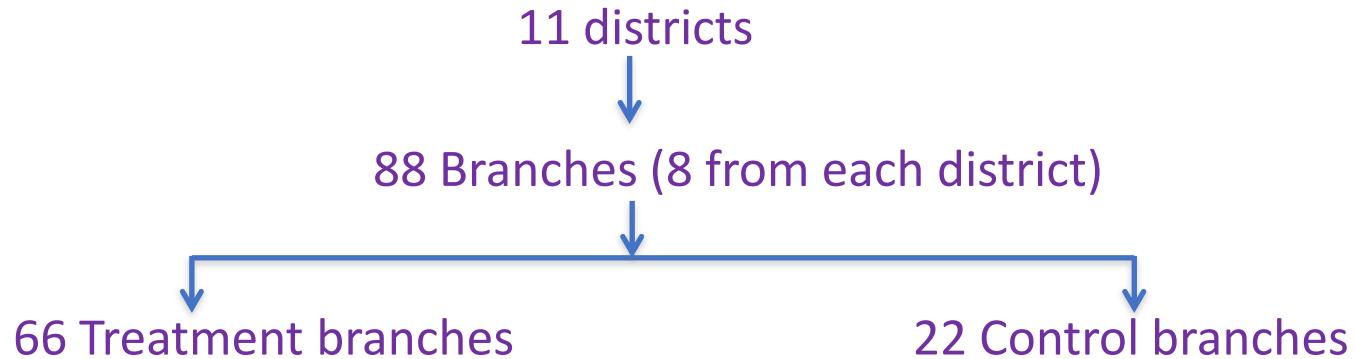
	Selection Criteria for STUP Package	Selection Criteria for OTUP Package
1	Owns <10 decimals of land	Owns ≤30 decimals of land
2	School-age children are engaged in labour	Unable to bear children’s educational expenses beyond primary level
3	Dependent on irregular income	Dependent on irregular income
4	Has no productive assets	History of failure to make successful use of NGO support
5	Has no male members capable of working	Failure to procure fish/meat/eggs in the last 3 consecutive days

OTUP Program Support Package – targeted to female heads of households



Experimental Design

- Randomise the program roll-out across 88 BRAC branch offices (1,385 communities) in the poorest areas of Bangladesh



- Average distance between two branches is around 12 km
- Randomise at the branch rather than community level to minimise contamination

Research questions

- Do micro-credit programs (such as OTUP) affect preferences of the recipient?
- If so, how?
 - Availability of credit:
 - entrepreneurial preferences and habits?
 - Or
 - dependence, moral hazard behaviour?
- Causal link between income/wealth and preferences? Diminishing or Constant time preference? CARA or DARA preferences?

Literature

- *Cash or Credit Transfer Programs*
 - Positive effect of *cash or credit transfer programs* on income, employment, food security, asset accumulation, and accessing and using of health services (Banerjee *et al.*, 2015; Bandiera *et al.*, 2016; Blattman *et al.*, 2016; Hossain & Wadood, 2020).
 - Programs that offer an allowance, cash, and loan, can affect preferences of the beneficiaries through changing ‘livelihood capabilities’ (Kabeer, 2018).
- *Effects of Income/Wealth on Preferences*
 - Discount rate is diminishing in income (e.g., Hartog *et al.*, 2002; Sarkar, 2007)
 - Absolute risk aversion is diminishing in income (e.g., Siegel, & Hoban, 1982; Stark & Zawojkska, 2015)
 - Absolute risk aversion declines, risk tolerance increases with wealth, rejecting CARA (Guiso and Paiella, 2008)
- **No RCT evidence** of the effect of wealth on preferences!

What this study is about

- This study is one of the first to provide *causal evidence* of the effects of income and asset on:
 - time preference
 - time consistency
 - risk attitude

Estimation model

- Panel survey data from the [baseline \(2016\)](#) and [follow-up \(2018\)](#) rounds, and [additional cross-sectional data from 2018](#).
- Estimate using D-D (model 1), D-D-D (models 2a, 2b), for individual i measured in district d at time t :

$$y_{idt} = \alpha + \beta_1 P_{id} + \beta_2 T_t + \delta(T_t * P_{id}) + \lambda X_{i0} + \gamma_d + \epsilon_{idt} \quad (1)$$

Where, P_{id} denotes outcome of 'treated' and T denotes survey wave
 Y_d denotes district dummy and ϵ_{idt} represents an error term

$$y_{idt} = \alpha + \beta_1 P_{id} + \beta_2 T_t + \beta_3 I_t + \beta_4(T_t * P_{id}) + \beta_5(P_{id} * I_t) + \theta(T_t * P_{id} * I_t) + \lambda X_{i0} + \gamma_d + \epsilon_{idt} \quad (2a)$$

$$y_{idt} = \alpha + \beta_1 P_{id} + \beta_2 T_t + \beta_3 A_t + \beta_4(T_t * P_{id}) + \beta_5(P_{id} * A_t) + \varphi(T_t * P_{id} * A_t) + \lambda X_{i0} + \gamma_d + \epsilon_{idt} \quad (2b)$$

I and A denote household per capita annual income and asset, respectively

- For cross-section data from 2018, we use the following model to estimate the impact of intervention

$$y_{id} = \alpha + \delta P_{id} + \lambda X_{i0} + \gamma_d + \epsilon_{id} \quad (3)$$

Measuring Impatience 1 (deployed in both rounds)

Survey questions:

1	Suppose you win Tk.200 in a prize. You can take this Tk.200 today or Tk.250 after one month. Which one will you take?	1 = Tk.200 today 2 = Tk.250 after one month
2	If you are told that you will get Tk.250 after two months , which one will you take?	1 = Tk.200 today 2 = Tk.250 after two months

- Tk. 200 (USD 2.38) is around 4 to 5 times higher than their per capita daily income (Tk. 51) and food expenditure (Tk. 42), respectively.

Impact on Time Preference

	Willing to accept Tk.200 today instead of TK.250 after <i>one</i> month			Willing to accept Tk.200 today instead of TK.250 after <i>two</i> months		
	(1)	(2)	(3)	(4)	(5)	(6)
Treat	1.051 (0.068)	1.387*** (0.173)	0.944 (0.068)	1.145 (0.130)	1.164 (0.256)	1.308** (0.168)
Year2	1.361*** (0.103)	1.384*** (0.105)	1.279*** (0.105)	0.789* (0.109)	0.793* (0.109)	0.860 (0.128)
Treat#Year2	0.784*** (0.073)	0.853 (0.139)	0.922 (0.095)	0.593*** (0.102)	1.047 (0.308)	0.593*** (0.111)
Income		1.041*** (0.011)			1.018 (0.019)	
Treat*Year2*Income		0.994 (0.009)			0.964** (0.015)	
Asset			1.051** (0.026)			0.934 (0.042)
Treat*Year2*Asset			1.036 (0.033)			0.805*** (0.048)
Observations	9,964	9,964	9,964		3,010	3,010

- Using panel data from two rounds

Measuring Impatience 2 (deployed in Year 2)

Survey questions:

Alternative time-preference task for question 1 (short-horizon)

Scheme 1 accept TK.200 **today** or TK.265 **after 3 months**

Scheme 2 accept TK.200 **today** or TK.280 **after 3 months**

Scheme 3 accept TK.200 **today** or TK.300 **after 3 months**

Scheme 4 accept TK.200 **today** or TK.330 **after 3 months**

Scheme 5 accept TK.200 **today** or TK.375 **after 3 months**

Alternative time-preference task for question 2 (long-horizon)

Scheme 1 accept TK.200 **after 3 months** or TK.265 **after 1 year & 3 months**

Scheme 2 accept TK.200 **after 3 months** or TK.280 **after 1 year & 3 months**

Scheme 3 accept TK.200 **after 3 months** or TK.300 **after 1 year & 3 months**

Scheme 4 accept TK.200 **after 3 months** or TK.330 **after 1 year & 3 months**

Scheme 5 accept TK.200 **after 3 months** or TK.375 **after 1 year & 3 months**

Impact on impatience

	Discount rate (short-horizon)			Discount rate (long-horizon)		
	(1)	(2)	(3)	(4)	(5)	(6)
Treat	0.978*** (0.005)	1.084 (0.060)	0.984*** (0.005)	0.979*** (0.004)	1.088 (0.057)	0.982*** (0.005)
Income		1.001 (0.004)			1.005 (0.004)	
Treat#Income		0.990* (0.005)			0.990** (0.005)	
Asset			1.000 (0.002)			1.001 (0.002)
Treat#Asset			0.994** (0.003)			0.996 (0.002)
Observations	4,982	4,982	4,982	4,982	4,982	4,982

Measuring Risk Attitude in Monetary Lottery 1 (deployed in both years)

- Respondents were asked to participate in a hypothetical lottery, with equal win-loss probability:

Types of lottery

- 1 get Tk.100 if wins or loses
 - 2 get Tk.200 if wins & get Tk.60 if loses
 - 3 get Tk.300 if wins & get Tk.20 if loses
 - 4 get Tk.400 if wins & get nothing if loses
-

Source: Binswanger (1980) and Bauer et al. (2012)

Impact on Risk Attitude

	Higher risk vs no risk (4,3,2 vs 1) (1)	Higher risk vs lower risk (4 & 3 vs 1 & 2) (2)	Highest risk vs lower risk (4 vs 1,2,3) (3)	Higher risk vs no risk (4,3,2 vs 1) (4)	Higher risk vs lower risk (4 & 3 vs 1 & 2) (5)	Highest risk vs lower risk (4 vs 1,2,3) (6)	Higher risk vs no risk (4,3,2 vs 1) (7)	Higher risk vs lower risk (4 & 3 vs 1 & 2) (8)	Highest risk vs lower risk (4 vs 1,2,3) (9)
Treat	1.084 (0.070)	1.170** (0.081)	1.204** (0.087)	0.771** (0.097)	0.946 (0.129)	1.041 (0.150)	1.154** (0.082)	1.211** (0.092)	1.182** (0.094)
Year2	0.984 (0.073)	0.719*** (0.061)	0.583*** (0.054)	0.973 (0.072)	0.717*** (0.061)	0.583*** (0.054)	0.999 (0.080)	0.686*** (0.062)	0.527*** (0.053)
Treat#Year2	1.087 (0.099)	1.224** (0.124)	1.305** (0.145)	1.028 (0.166)	0.997 (0.177)	1.096 (0.209)	0.941 (0.095)	1.033 (0.116)	1.156 (0.143)
Income				0.981* (0.010)	0.990 (0.011)	0.992 (0.012)			
Treat#Income				1.014 (0.149)	0.861 (0.136)	0.873 (0.146)			
Treat#Year2#Income				1.002 (0.009)	1.011 (0.009)	1.010 (0.010)			
Asset							0.988 (0.023)	1.037 (0.027)	1.080*** (0.031)
Treat#Asset							1.042 (0.276)	0.833 (0.234)	0.606* (0.180)
Treat#Year2#Asset							1.002 (0.015)	1.015 (0.016)	1.031* (0.018)
Observations	9,964	9,964	9,964	9,964	9,964	9,964	9,964	9,964	9,964

Measuring Risk Attitude 2 (deployed in Year 2)

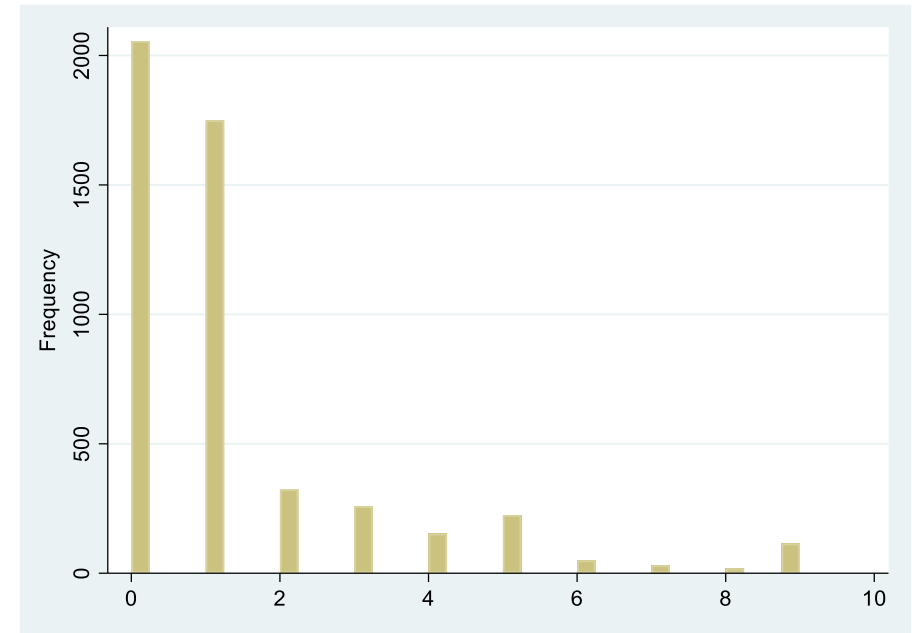
Survey question:

Suppose you are offered the opportunity to participate in a lottery in which the chances of winning and losing are equal. If you win you will get Tk. 10,000, and if you lose you will not get anything back. What is the most/maximum amount are you willing to pay to participate in this lottery?

- A. Nothing (Tk. 0)
- B. Up to Tk. 1,000
- C. Up to Tk. 2,000
- D. Up to Tk. 3,000
- E. Up to Tk. 4,000
- F. Up to Tk. 5,000
- G. Up to Tk. 6,000
- H. Up to Tk. 7,000
- I. Up to Tk. 8,000
- J. Tk. 8,000 to Tk. 10,000

Measuring Risk Attitude in Financial Investment (2)

- Count data exhibit over-dispersion, and more zero observations than explained by the basic count data distributions
- Positive counts occur once a 'threshold' or 'hurdle' is crossed
- We use **hurdle model with negative binomial**



Mean: 1.328, Variance 3.717

Impact on Risk Attitude in Financial Investment

	Odds ratio (zero part)	Rate ratio (Hurdle part)	Odds ratio (zero part)	Rate ratio (Hurdle part)	Odds ratio (zero part)	Rate ratio (Hurdle part)
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.980 (0.062)	1.069^{***} (0.027)	17.084 ^{***} (13.765)	0.508 ^{**} (0.138)	1.095 (0.075)	1.058 ^{**} (0.028)
Income			1.115 [*] (0.069)	1.020 (0.020)		
Treat#Income			0.753^{***} (0.060)	1.075^{***} (0.029)		
Asset					1.016 (0.031)	1.012 (0.012)
Treat#Asset					0.897^{***} (0.032)	1.000 (0.014)
Observations	4,982	4,982	4,982	4,982	4,982	4,982

Summary of Results

Program effect:

- Micro-credit programs *promote* pro-entrepreneurial preferences – beyond what we usually measure.
 - Program beneficiaries become more patient and more risk taking in the financial domain. Well-designed micro-credit programs may improve long-term livelihoods.

Income/wealth effects:

- We find causal evidence of income/asset reduces time discounting (diminishing impatience).
- First RCT-based causal evidence of *diminishing absolute & relative risk aversion (DARA, DRRRA)*, rejecting the *constant absolute & relative risk aversion (CARA, CRRRA)* preference.