

Development Economics (PhD) Savings

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- 1 *Udry, C. (1995), Risk and Saving in Northern Nigeria," American Economic Review 85(5), 1287-1300.
- 2 *Anderson, Siwan, and Jean-Marie Baland (2002). The Economics of ROSCAs and Intra-Household Resource Allocation. Quarterly Journal of Economics, 117 (3): 963-995.

Motivations

- Poverty and extreme income variability are common in rural areas of developing countries
- But income variability \implies consumption variability if households do not have access to *ex post* coping mechanisms
 - Risk pooling through informal insurance or drawing on own savings
- Udry investigates the extent to which Nigerian hhs use their assets to cope with risk
 - Do households dissave when confronted with adverse shocks to their incomes?

Data and Setting

- Nine-round survey of 200 farming households in Northern Nigeria containing:
 - Saving: stock of grain and farm inputs, livestock, and goods for trading
 - Random shocks to income: Specific incidents of discrete adverse events on each plot (wind damage, flooding, waterlogging, pest attack etc.)
 - Two indexes of adverse shocks for each household for each period (there are two periods April-Sept, and Sept-Feb) and each type of land (upland or lowland)
 - Timing: Each period's shocks affect each period's income, and thus saving

Empirical Strategy

- Saving by hh j in period t , (S_{jt}):

$$s_{jt} = d_t\alpha + X_j\beta + Z_{jt}\gamma + d_t * X_j\delta + v_{jt} \quad (1)$$

- X_j is a vector of hh characteristics,
- (d_t) an indicator of the period (season), and village-level shocks to income
- Z_{jt} represents transitory idiosyncratic production shocks
- $d_t * X_j$ an interaction term
- $\alpha, \beta, \gamma,$ & δ are parameters of the model
- $\gamma < 0 \implies$ assets are used as buffer stocks against the receipt of adverse shocks
- Key assumption: idiosyncratic shocks across the two periods are independently distributed (the shocks are hence transitory)

Saving

Udry (1995): Results

TABLE 2—THE DETERMINANTS OF SAVING

Variable	Overall saving (i)		Grain saving (ii)		Livestock saving (iii)		Cash saving (iv)	
	Parameter estimate	<i>t</i>	Parameter estimate	<i>t</i>	Parameter estimate	<i>t</i>	Parameter estimate	<i>t</i>
Intercept	-0.556	-0.25	-0.273	-0.13	-0.388	-0.26	-0.124	-0.55
Period = 2	-2.526	-1.80	2.017	1.63	-4.544	-4.57	0.345	2.65
Adverse shocks: ^a								
On upland land	-0.197	-2.65	-0.271	-3.85	0.070	1.41	-0.033	-2.89
On lowland land	-0.156	-0.84	-0.181	-1.07	0.018	0.14	-0.003	-1.46
Village = 1	4.081	2.54	3.757	2.56	1.125	1.02	0.473	3.00
Village = 2	0.952	0.63	0.093	0.07	0.928	0.89	0.089	0.60
Village = 3	0.547	0.36	0.103	0.07	0.410	0.39	-0.108	-0.72
Past wealth ^b	0.022	4.80	0.000	0.11	0.023	7.35	-0.000	-0.13
Age of household head	0.008	0.16	-0.060	-1.31	0.053	1.55	-0.005	-1.07
Number of wives	-0.021	-0.02	-0.239	-0.28	0.159	0.25	0.015	0.17
Number of males aged 10–60	0.269	0.74	0.306	0.93	0.088	0.36	0.049	1.40
Number of dependents	0.103	0.41	0.430	1.87	-0.260	-1.51	-0.020	-0.81
Household member with a special skill	-0.580	-1.01	-0.702	-1.34	0.158	0.40	-0.050	-0.88
Upland land owned	-0.354	-1.93	-0.438	-2.52	0.094	0.77	0.019	0.88
Lowland land owned	0.282	0.42	0.637	0.99	-0.488	-1.09	-0.075	-0.95
Upland land × period = 2	2.598	9.72	1.347	5.68	1.238	6.56	0.008	0.33
Lowland land × period = 2	-2.795	-2.42	-0.781	-0.77	-1.965	-2.40	0.073	0.69

- Ideosyncratic shocks affect savings
 - Consistent with the model of consumption smoothing: saving is lower in hhs affected by idiosyncratic shocks
 - Idiosyncratic shocks are not fully insured by risk-pooling mechanisms (a rejection of pareto-efficiency in allocation of risk in the villages)
 - The effects of seasonality and aggregate shocks on saving are mediated by land ownership
- The effect of idiosyncratic shocks on savings is realized through changes in grain stocks
- Cash holdings grew significantly less rapidly in hhs affected by shocks on upland plots

Saving

Udry (1995): Results cont.

- Livestock saving is not affected by the shocks. Why?
 - Livestock is used for production - consistent with optimal saving behavior
 - Its ownership is subject to diminishing returns
- Indivisibility and transaction costs associated with livestock could also be reasons (but not documented in the study area)
- Households myopically save a constant fraction of the output of each of their activities
- They increase their saving in anticipation of future shocks

Saving

Udry (1995): Conclusions.

- Households in poor countries save in the form of assets to stabilize variable consumption
- Hhs dissave when a shock occurs and save more when they earn more income
- Consumption is smoothed through saving in asset not subject to diminishing returns
- Hhs anticipate shocks and increase their current saving in anticipation of shocks
- The analysis can be extended by using a longer panel data

Motivation

- Rotating savings and credit associations (rosocas) are very common informal financial institutions in Developing countries
- ROSCAs are economically significant:
 - High adult population participation (50-95%) in West Africa
 - High share of GDP (e.g., 8-10% in Ethiopia)
 - One-half of national savings in Cameroon
 - Twice as high as the formal credit sector in Karala India
- How they work
 - Group of individuals (usually live in the same community) gather for a series of meetings
 - Each contribute to predetermined amount into a collective “pot”

Motivation cont.

- The pot is given to one member at each meeting (who is later excluded from receiving the pot in the future but still obliged to contribute)
- Meeting and contributions continue until each member gets the pot
- Significant variation among roscas in:
 - Frequency of meetings
 - Amount of Contribution
 - The number of members
 - The way the order the winner is determined
- Viewed as means of saving for purchase of indivisible goods by people with limited or no access to formal credit
- No interest income in saving through roscas

Motivation cont.

- The big question: why do people save through roscas instead of saving individually through formal financial institutions?
- Roscas allow individuals to receive the pot, and hence buy the indivisible good, earlier than through individual savings (Basley et al., 1993)
- This is not true for for the 325 rocsas in the urban slum Kibera of Nairobi Kenya considered in the paper
 - Most of the roscas follow a predetermined order known before the rotation cycle begins
 - Hence, there is no randomness in receiving the pot
 - Basley et al.,'s rationale doesn't seem to be the case here
 - With the predetermined order, the last receiver of the pot should be worse off and quit from the rosca in the next cycle
 - In the roscas in Kibera, this was not the case: all the members continue the rosca

Motivation cont.

- Other key observations from the Kibera roscas
 - 84% of members are women \implies doesn't seem to be random.
 - Most of them are married and earn their own income
- **Key research question:** Why are married and working women the main members of roscas?
- Anderson & Baland (2002) develop a new argument based on intrahousehold conflict to explain this
 - Basis: asymmetric preferences for household goods across men and women
 - Tension over the use of income within households
 - Women devote higher share of their income to family needs than men
 - Women's income promote children's well-being than men's
 - Men put higher proportion of income for personal needs (even when the household is in poverty)

Motivation cont.

- More pronounced in Africa and other S. Asian countries
 - Men spend a higher proportion of income (relative to women) on items like alcohol and cigarettes while women more likely purchase goods for children and for general household consumption (Hoddinott and Haddad, 1995)
 - Not unique to African households: found in countries like France and Canada
 - Unearned income has bigger effect on family health when given to women than men in Bangladesh (Thomas, 1990)
 - Micro-credit has a larger positive effect on schooling, hh expenditures, and assets when women are the participants (Pitt and Khandker, 1998)
- The key factor here is the poor bargaining position of women in the household
- Access to employment outside the home increases women's domestic decision making power and control over resources

Ethnographic Evidence

- Qualitative information on why and how women join roscas was collected from the Kibera area
- Most cite their objective as “to help poor women to educate their children”
- Others as “to be independent from husbands”
- Main means to save to pay for school fees, uniforms, kitchenware or furniture
- Women report about saving disagreement with their husbands
- Roscas have clear rules and regulations which members should follow (e.g., timely contributions and not missing meetings)
- Are also used as venue for socializing among women
- Confidentiality and secrecy is followed to protect rosca money from husbands

The Model

- Different preferences for an indivisible good (which requires savings to acquire) drives conflict within the household
- Relative to men, women have a larger preference for the good (e.g., school fees due to higher concern for children)
 - This make them choose higher saving than men
- Men have greater preference, relative to women, for present consumption than saving for an indivisible good
 - This makes women prefer to save in a rosca than put money at home
 - Roscas provide forced savings mechanism that the women can impose on her household
 - The household may be willing to purchase the indivisible good ex post when the woman comes home with the pot, even ex ante the household was not willing to save at all
- This notion has been supported by previous studies

The Model cont.

- Women in South India: “Roscas play an important role in increasing women’s control over resources which they can use to increase assets in the family” (Mayoux and Anad, 1995)
 - “Important in cases where men were spending much of their income on alcohol and gambling”, p.180
- In Indonesia “Women tend to develop financial strategies to preserve money for their personal needs and family responsibilities (Niger-Thomas, 1995)
- Such a concern for dealing with men’s behavior extends to other forms
 - In Bangladesh “Women engage in informal exchange in kind (e.g., rice) so that men don’t pay attention (Goetz and Sen Gupta, 1996)

Empirical Predictions

- The share of income of the woman is an important factor to join a rosca but it would have an “inverted-U” shape impact on participation
 - At low level, the woman cannot afford to contribute
 - At very high level, household saving = her saving \implies there is no need to join rosca

Data

- Collected from the biggest slum in Nairobi (500,000 residents), Kenya in 1996-1997
- Hhs are subject to enormous risk to health and income with no formal insurance
- Gave rise to informal risk-sharing, credit and saving (rosca), funeral groups and collective investment groups
- 520 randomly selected households were interviewed for four months
- Information on education, work activity, and income
- Information on 620 groups (385 were roscas) in which the households were members was collected
- See table 1 for descriptive statistics

Data

TABLE I
BASIC INFORMATION ON ROSCAS^a

Variable	All roscas	Women only	Mixed
Number of members (median)	13	12	17
Months existed (median)	24	24	24
Contribute every day (proportion of roscas)	0.10	0.13	0.06
Contribute every week	0.35	0.36	0.30
Contribute every 2 weeks	0.06	0.09	0.01
Contribute every month	0.49	0.43	0.62
Monthly contribution (mean)	588.64	531.18	701.20
Length of cycle (median, in months)	6.07	5.83	11.33
Number of cycles (median, in lifetime of rosca)	3.21	3.67	2.57
Group comprises only women (proportion of roscas)	0.65	1.00	0
Group comprises only men	0.06	0	0
Group comprises both men and women	0.30	0	1.00
All members are same ethnicity	0.37	0.36	0.38
Order is unchanged each cycle	0.69	0.75	0.57
Started group with friends/relatives/neighbors	0.85	0.86	0.77
Group has secondary role (investment/insurance)	0.25	0.28	0.23
Number of observations	385	258	108

TABLE II
MEANS AND STANDARD DEVIATIONS OF CHARACTERISTICS OF POPULATION AND ROSCA
PARTICIPANTS: TOTAL SAMPLE AND WOMEN LIVING IN COUPLES^a

Variable	Total sample		Women in couples	
	All	Rosca members	All	Rosca members
Participates in a rosca	0.25 (0.44)	1 (0)	0.53 (0.50)	1 (0)
Total monthly rosca contribution	178 (514)	702 (821)	369 (721)	699 (870)
Female	0.53 (0.50)	0.84 (0.37)	1 (0)	1 (0)
Age	29.4 (9.6)	32.5 (8.4)	28.9 (6.5)	30.5 (6.5)
Married	0.59 (0.49)	0.71 (0.46)	1 (0)	1 (0)
Earns labor income	0.58 (0.49)	0.76 (0.43)	0.49 (0.50)	0.65 (0.48)
Has at least primary school	0.57 (0.49)	0.47 (0.50)	0.45 (0.50)	0.46 (0.50)
Monthly individual income	3141 (4909)	4001 (6252)	2457 (5860)	3599 (7471)
Female share in couple income	0.05 (0.16)	0.15 (0.22)	0.20 (0.25)	0.26 (0.25)
Female income share = 0	0.87 (0.34)	0.63 (0.48)	0.51 (0.50)	0.35 (0.48)
Female income share >0 & ≤25%	0.03 (0.16)	0.07 (0.26)	0.10 (0.30)	0.13 (0.34)
Female income share >25 & ≤50%	0.08 (0.27)	0.22 (0.41)	0.29 (0.46)	0.39 (0.49)
Female income share >50 & ≤75%	0.01 (0.12)	0.05 (0.21)	0.05 (0.22)	0.08 (0.28)
Female income share >75 & ≤100%	0.01 (0.11)	0.03 (0.16)	0.05 (0.21)	0.05 (0.22)
Household monthly income	8009 (9207)	8370 (9456)	7860 (9329)	9515 (9927)
Monthly food expenditures	5250 (3031)	4976 (2761)	5081 (2547)	5351 (2830)
Monthly luxury expenditures	368 (723)	367 (700)	343 (708)	349 (663)
Monthly children expenditures	1761 (2550)	1862 (2902)	1413 (2273)	1880 (2762)
Household size	5.05 (2.14)	4.8 (2.1)	4.96 (1.90)	5.38 (1.90)
Number of children	2.21 (1.63)	2.3 (1.6)	2.42 (1.58)	2.74 (1.55)
Years in Kibera	7.60 (6.19)	7.96 (5.84)	6.63 (5.04)	7.75 (5.32)
Native language: kikuyu	0.23 (0.42)	0.24 (0.43)	0.19 (0.40)	0.24 (0.43)
Native language: luhya	0.18 (0.39)	0.17 (0.38)	0.17 (0.37)	0.15 (0.36)
Native language: luo	0.40 (0.49)	0.38 (0.49)	0.44 (0.50)	0.43 (0.50)
Native language: kamba	0.06 (0.23)	0.07 (0.26)	0.06 (0.23)	0.07 (0.25)
Native language: kisii	0.10 (0.30)	0.10 (0.29)	0.10 (0.30)	0.08 (0.28)
Number of observations	1269	324	344	182

Empirical Results

- Two main equations:
 - The probability of participating in rosca
 - Monthly rosca contribution (conditional on rosca participation)
 - Two-stage Heckman Selection Model
 - Alternative: tobit

- First Stage results (Table III)
 - Being female and female member of a couple are important determinants
 - Female share of couple income has the predicted inverted U-shape impact
- Second stage results (Table IV)
 - Female share in couple income is a significant and positive determinant of rosca contributions
 - Inverted-U shaped impact
 - The inverse Mill's ratio is not significant \implies the two decisions are independent

- Female income share is a potentially endogenous variable
 - A&B try an IV regression using the difference in total years employed in present occupation between the wife and husband
 - This is a good proxy for relative job stability which affects relative bargaining power
 - Results did not change
- Possible reasons for rosca participation
 - To avoid risk of theft & unexpected demand for help by relatives
 - To discipline members to save
- But these variables did not seem to play a role
- If it was the case, household total income (instead of female share of income) should have been the most important determinant

Conclusions

- Attempted to explain why married women with regular earnings mainly take part in roscas
- The authors used a new argument based on differential consumption between wives and husbands
- Women choose higher savings than the household and thus engage in a rosca
- Even though the husband would not want her to take part ex ante, he agrees to her investment decision ex post when she comes home with the pot
- Rosca participation follows an inverted-U relationship with a woman's bargaining position within the household
- These observations have been qualitatively confirmed by participants