Rosca Participation in Benin : a Commitment Issue*

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Abstract

In the light of first-hand data from a Beninese urban household survey in Cotonou, we investigate several motives aiming to explain participation in Rotating Savings and Credit ASsociations. We provide empirical findings which indicate that individuals use their participation in a rosca as a device to discipline themselves to save money and commit against problems of self-control.

Keywords: ROSCA, self-control, Benin

JEL Classifications: G2, O16, O17

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1 Introduction

There have been numerous studies underlining the importance of rotating savings and credit associations (roscas) in developing countries. Roscas are commonly found in rural areas and in the poorer neighbourhoods of the cities in developing countries and drive a considerable part of individuals' savings. Bouman (1995) refers to many african countries showing high degrees of participation and the importance of the savings implied. In developed countries, these institutions are mainly used by migrants[1].

A basic description of these associations can be given as follows: A group of people gather on a regular basis for a cycle of meetings. During one meeting all members contribute a fixed amount of money to a common pot allocated to one of them. The latter is excluded from the reception of the pot in subsequent meetings but is still obliged to contribute to the pot for the rest of the cycle. This process repeats itself until each member has received the pot, a cycle is then being completed. Then, the rosca may begin another cycle or decide to discontinue. Groups vary widely between one another in terms of the amount of contribution, number of members and frequency of meetings. In fact some groups may function on the basis of weekly or monthly compulsory meetings whereas others which don't hold meetings send a member for collecting payments. Operating modes of roscas can differ considerably. The process by which the pot is allocated can either be done at random[2] (*random roscas*), through a decision imposed by the governing body of the group (*decision roscas*) or through a bidding process (*bidding roscas*).

Due to high transaction costs and incomplete markets, rosca members are mainly poor individuals who have little access to formal savings and credit markets.[3] In the litterature roscas are usually regarded as a means for poor people to save money in order to make an indivisible expense (a lumpy expenditure). Empirical analysis by Handa and Kirton (1999) and van den Brink and Chavas (1997) confirm this view. Evidence we collected from a sample of 496 households in Cotonou, Benin, support this as well.

Rosca participation implies costs. They do not provide interest rates. Moreover, members suffer from the risk of default from other members (which could eventually lead to the breakdown of the rosca), from less flexibility than saving on their own (as the rosca saving rate is likely to differ from their optimal saving rate) and, in most cases, from opportunity costs of time spent by taking part in meetings of the group.[4] Despite

[1] See among numerous references, Srinivasan(1995) and Summerfield(1995).

[2] This can be done once at the beginning of a cycle (establishing the order for its entire duration) or the random draw can be repeated at the beginning of each meeting.

[3] As an example, a small survey of Beninese banks showed us that conditions for opening an account in any public or private banks of Cotonou, such as a fixed guarantee deposit, the possession of an identity card (the costs of which are prohibitive) and literacy skills for the understanding of contracts all act as strong deterrents against poor people.

[4] Nevertheless our evidence shows that few members if any considered meeting as valuable time wasted. It rather seems that members like meeting and spending time together. Several groups organize

all these costs, these groups show popularity which proves it must be beneficial to their members, who, in need of a saving device, are ready to pay for it[5]. This brings thus the question as to why an individual would decide to join a rosca instead of saving on their own.

This important question has received various answers in the literature. One formulated by Besley, Coate and Loury (1993) is that roscas allow individuals to receive the pot earlier than through individual savings and thus to buy the indivisible goods desired before it would have been possible in autarky. This off course being the case for all members except the last one in the cycle. A second motive for joining rosca is that such association can act as a substitute to insurance, this being particularly true in developing countries where markets for insurance are absent. However these two answers appear to be unfit for the evidence we collected in Benin and we discuss why below.

Yet another rationale was provided by Anderson and Baland (2002) based on the role that roscas can play as a commitment device. Their work relies on intra-household conflicts in consumption decisions and on the existence of asymmetric preferences for household goods between men and women. Still this rationale does not fit our empirical findings partly because of the Beninese intra-household decision process and for additional reasons that we will exhibit.

In the light of our evidence it appears that the fundamental reason as to why one individual would join a rosca is rather the need of commitment due to self-control problems. If people have present biased preferences or suffer from short-term temptations and are aware of their consequences, it is likely that they would prefer to limit the set of options available to them. They could then adhere to a rosca to bind themselves to their second best optimal saving rate thus securing part of their revenues against everyday temptations. This rationale was proposed by Gugerty (2003). She argues that in the absence of alternative commitment saving strategies, people aware of their time inconsistency problem would turn to roscas. Our paper distinguishes itself with respect to the main literature in two ways. First it provides strong and original empirical findings in favor of the self-commitment argument. While Gugerty (2003) provided some with a limited database, our allows us to solidly complete them and provide additional evidence. Second, it documents the fact that beninese spouses evolve in a non-cooperative framework and that decision to join a rosca is an individual one. This brings additional light along with rare studies pertaining to the African intra-household decision process.

We thus intend in the following section to describe the survey on which our analysis is based. We then present in section 3 field evidence that describe how husband and

many activities aside the pot distribution that allowed members to get involved in various ways (folklores, singing, etc). Meetings are also a precious opportunity for exchanging information.

[5]See in particular Rutherford (1999) on this issue of costs.

wife interact with each other. Section 4 investigates the self-commitment issue, section 5 presents conjectures which we then proceed to test in section 6. In section 7 we review reasons for participation previously given in the literature and relevant alternative explanations and section 8 concludes.

2 Description of our Survey

We use data we collected in 2004 in the two districts of Vossa and Enagnon located on the outskirts of Cotonou (a city of about 1.1 million inhabitants). They are known to the city's authority as being the poorest. Vossa is located near an inner bay of fresh water and has a community of fishermen. Its 63 hectares are encircled by stagnating waters and swamps which represent an important vector of disease. This district has not yet been divided into plots, though a long term project has been launched during our stay. Vossa is let to itself: the authorities of Cotonou have not yet paved any of its roads even its principal axis. The recurrent and important problem of floods has not been dealt with even if it critically and annually paralyses the area during a few months. Enagnon, a dense slum located on the Atlantic Ocean shore, has also received low attention and important sanitary problems have not been tackled yet. Half of its area of 60.1 hectares has been divided into plots in 1998. Enagnon encompasses an adjacent slum called Enagnon-plage which is inhabited with a majority of fishermen living in huts on the beach. Vossa and Enagnon are near downtown Cotonou where a large part of their inhabitants work and commute everyday. No formal saving and investment institutions, either public or private, such as banks and NGOs are present in these two districts, the selection of which dates back to a first mission in 2002 that revealed that many informal groups such as insurance funds and roscas were active there.

During the first three months of 2004 we surveyed 496 households: 110 in Vossa and 386 in Enagnon (of which 116 are located in Enagnon-plage). Selection of each household was done randomly. The first wave of interviews aimed at creating contacts, getting housing information and obtaining information on each member: religion, activity, education, work, etc. For all members older than fifteen, we required enumerators to fill in a sheet detailing their expenses on durable goods incurred during the last six months and to carefully report their expenses on non-durable goods for the week previously ended. A second round was needed for members of informal groups. During this visit enumerators collected detailed information on the group(s) they belong to. For a maximal accuracy, all members of each household were interviewed separately throughout the successive waves of our survey so that tricky issues related to expenses or income were only tackled privately. Particular attention was thus put on confidentiality which was strictly followed by our enumerators. Further details on our survey methodology

can be found in Appendix 9.1.

	Total Sample				Women				Men			
	All		Rosca memb.		All		Rosca memb.		All		Rosca memb.	
Participates in Rosca	0.17	(0.03)	1	(0)	0.15	(0.02)	1	(0)	0.19	(0.03)	1	(0)
Total monthly rosca contribution	1804	(256)	10492	(1452)	1646	(259)	10898	(1617)	1969	(274)	10161	(1329)
Female	0.51	(0.00)	0.45	(0.02)								
Age	33.1	(0.25)	39.8	(0.97)	32.9	(0.49)	39.7	(1.09)	33.3	(0.05)	39.8	(0.87)
In couple	0.52	(0.04)	0.74	(0.07)	0.52	(0.04)	0.69	(0.09)	0.52	(0.04)	0.79	(0.06)
Primary degree	0.28	(0.02)	0.23	(0.07)	0.18	(0.01)	0.12	(0.05)	0.40	(0.02)	0.32	(0.09)
Salaried	0.12	(0.01)	0.19	(0.02)	0.03	(0.01)	0.05	(0.03)	0.22	(0.01)	0.30	(0.02)
Monthly individual income	48223	(2672)	86377	(5235)	40554	(1739)	69386	(2673)	56237	(3720)	100212	(12663)
Monthly individual expenditures	30789	(2912)	47682	(2075)	27671	(2711)	43746	(3289)	34049	(3124)	50888	(859)
Number of dependant persons	1.91	(0.19)	3.18	(0.30)	2.05	(0.12)	3.37	(0.11)	1.77	(0.27)	3.02	(0.48)
Number of months, same job	85	(2)	159	(19)	82	(2)	155	(16)	87	(5)	163	(22)
Number of months, same block	191	(15)	226	(12)	174	(19)	183	(12)	209	(11)	261	(11)
Native Language : Ashanti	0.01	(0.00)	0.01	(0.01)	0.00	(0.00)	0.01	(0.01)	0.01	(0.01)	0.01	(0.01)
Native Language : Fon	0.33	(0.14)	0.29	(0.13)	0.31	(0.12)	0.23	(0.07)	0.34	(0.16)	0.34	(0.18)
Native Language : Popo	0.35	(0.05)	0.43	(0.09)	0.37	(0.04)	0.48	(0.13)	0.33	(0.07)	0.38	(0.08)
Native Language : Yoruba	0.04	(0.01)	0.04	(0.01)	0.04	(0.02)	0.06	(0.02)	0.04	(0.01)	0.03	(0.01)
Native Language : Peul	0.03	(0.03)	0.03	(0.03)	0.02	(0.02)	0.02	(0.02)	0.04	(0.04)	0.04	(0.04)
Native Language : Goun	0.23	(0.12)	0.19	(0.14)	0.24	(0.10)	0.18	(0.13)	0.22	(0.14)	0.19	(0.14)
Vossa	0.58	(0.38)	0.53	(0.37)	0.58	(0.38)	0.56	(0.37)	0.58	(0.38)	0.51	(0.38)
Enagnon	0.31	(0.34)	0.25	(0.29)	0.31	(0.34)	0.23	(0.27)	0.31	(0.35)	0.27	(0.30)
Beach	0.11	(0.15)	0.22	(0.26)	0.11	(0.15)	0.22	(0.26)	0.10	(0.14)	0.22	(0.26)
Number of observations	1179		222		604		97		575		125	

standard errors in parentheses
statistics corrected with sampling weights

Table 1: Individual characteristics with respect to rosca participation

All the 496 households we surveyed represent 2083 individuals of which 894 are aged less than sixteen, we are thus left with a sample of 1179 individuals divided in 604 women and 575 men. We show in Table 1 relevant statistics according to gender and participation status. These are used as variables on which is based our econometric analysis. One can find a detailed description of some of these variables in Appendix 9.2. We see an important difference in terms of age: mean age of total sample is significantly (at 5%) lower than those of rosca members. Women seem less educated than men as a significantly smaller proportion of them got a primary degree. There is also a larger proportion of male salaried, this being true whatever the participation status. Differences in monthly income show that rosca members are significantly richer than non members, this remains valid in the female subsample and in the male subsample for monthly expenses. It appears as well that female rosca members are in charge of larger households than female non members.

3 Secrecy and Individual Decisions within Household

At the time of our detailed survey, we carried out several informal meetings with residents of Vossa and Enagnon which showed us that secrecy is the rule between spouses. An important proportion of women and men with whom we spoke in these two poor neighbourhoods of Cotonou said that their spouse was unaware of the course of their occupational activities and was thus unable to guess their income. Many said, no matter the gender or age or the respondant: "the less he/she knows about my activities, the better it is." Or "I don't want him/her to know my income otherwise he/she will ask me to meet the cost of such and such expenses." Spouses are overwhelmingly secretive and it even seems that giving as little information as possible to his/her partner is quite natural. Hence, rarely do spouses ask questions concerning their partner's income or inquire about their activities. It is a kind of convention allowing each member of the couple to keep her income more or less secret. It seems the main reason for this is to give each individual as much latitude as possible in managing personal income. Thus by being secretive spouses avoid sharing their personal earnings or making common budget and retain the sole control over their personal expenditures.

We included questions pertaining to this in our survey and addressed these to 587 respondants (out of 1179) being at least sixteen of age and in couple. To the question "Can you estimate your spouse's revenues?" : 79% answered no, 11% yes and 10% partially. Results were similar for: "Do you think your spouse knows your revenues?": 76% answered no, 16% yes and 8% partially. This evidence allows us to depict union or couple as an arrangement made between two persons in order to provide for their respective needs in terms of public goods and to those of any children.

Another remarkable fact that we came across is that contributions to public goods

are often made in Benin according to local social norms fixing the intra-household allocation of expenses items according to gender. The majority of these devolve to the husband who should take care of everything related to the house (rental fees, repair costs, electricity), give money for housekeeping, pay the school fees, clothing, etc. His wife should take care of the family, cook and pay water bills. In general, male income is not sufficient to cover the needs of the family, so that the wife has to spend more for the household than what had been allotted to her.

As long as the basic needs of the family are fulfilled, selfish[6] individuals would prefer to spend more on private goods, the utility of which is superior. Each spouse tries to depart from the status-quo expenses by passing on to the other some share of their common burden. They then enter an infinitely repeated non-cooperative game where each spouse tries to lower his/her contribution to the provision of the public good as it is detrimental to his/her own consumption of private goods (savings included).

In order to implement this strategy each one of them hides their income and tries to give the partner a blurred image of their earnings. This implies that spouses also hide as much as they can their expenses otherwise it could lead one's partner to have a guess of his/her revenues. Were one player able to know their partner could spend more for the household, they would claim to pay less. Therefore, none of the spouses gets incited to reveal the true amount of their earnings.

This is not to say that spouses do not interact with one another concerning the provision of public good they provide. A minimum of common management is required in a couple with respect to their respective gender role in the couple. But it remains that spouses avoid disclosing information on their income and their expenditures. Hiding revenues can appear an easier task than hiding expenses. However as a large fraction of couples don't interact during working hours because their work brings them in different parts of the city, meal expenses, transportation or medicines, transfers for relatives or collegues, gifts for funerals and momentary luxury spendings such as alcool and cigarette can easily be concealed. Moreover even larger expenses can be kept away from spouse knowledge. As we show in Table 3 almost half of rosca members invest the pot in their small business. A woman buying stocks of provisions to store can conceal them in her shop, taxi drivers paying for regular motorcycle or car repairs or fishermen buying new equipment can easily hide their investments.

Secrecy as strategic information transmission (Crawford and Sobel, 1982) prevents the household to benefit from efficiency gains usually reachable with the repetition of the game. The Folk theorem indeed claims that cooperative outcomes are sustainable in infinitely repeated non-cooperative games as long as the discount factor is not too high but in this case as neither incomes nor strategies are observable, no such pareto superior outcome can be reached. In these conditions, detection of fraud or deviation from the

[6] 'Selfish' is to be taken in the sense that utility of one agent does not depend on any other agent's utility.

cooperative agreement is in fact rendered impossible. This explains why agents may be stuck in a pareto-inferior equilibrium, supported by social norms[7]. Both spouses have thus no incentives to reveal their real income or personal expenses (which could lead to rough estimations of the earnings).

We observed these behaviors as widespread and accepted to such an extent that few are those who try to break this tacit rule and inquire about their partner's income. A selfish spouse will thus individually decide whether or not to join a rosca. This decision depends on their available income net of public goods expenses and on other relevant individual characteristics.

4 Commitment Device Against Self-control Problems

According to two different economic theories, agents might prefer to commit themselves and limit the set of options available to them. Gul and Pesendorfer (2001 and 2004) present a dynamic consistent preferences explanation of this phenomenon, namely the temptation theories according to which an agent undergoing short term temptations in conflict with their long run self interest would be "unambiguously better off when ex ante undesirable temptations are no longer available" (Gul and Pesendorfer, 2001, p.1406). And even if they do not expect to succumb to the temptation in the future, individuals with self-control problems will expend resources to remove tempting alternatives from their choice sets (ibidem, p.1420). In this case, preference for commitment arises from a desire to avoid temptation rather than from a change in preference.

The second approach, well known in the literature[8], departs from the dynamic consistent preferences hypothesis and corresponds to a reversal of the preferences when the date of decision-making approaches. It appears from psychological experiments that people tend to have present-biased preferences (the shape of which is roughly hyperbolic) and discount time at a non constant rate (higher in the very short than in the longer term)[9]. An individual having self-control problems and being sophisticated (being aware of the problem and its consequences) would prefer to commit herself. Her current self may want to restrict the choice set available to her future selves to overcome such time-inconsistencies.

Roscas seem to respond to a need of commitment against one's time inconsistency preferences and temptations. According to Gugerty (2003), in the absence of alternative

[7] The threat points of this game consist mainly of reputation losses: wives can complain to their parents-in-law (and then to their own parents) about their son, unable to provide decent living conditions to his family. Her husband endowed by custom with most of the burden is able to force his wife to provide a bigger share in the family budget. Would she refuse to make efforts she in last resort could be repudiated (which would mean the end of her social life and bearing important consequences thereof).

[8] see among many others, Laibson (1996, 1997), O'Donoghue and Rabin (1999)

[9] where $\delta \leq 1$ and $0 < \beta < 1$ in $U^t(u_t, u_{t+1}, \ldots, u_T) = \delta^t u_t + \beta \sum_{\tau=t+1}^{T} \delta^\tau u_\tau$

commitment savings strategies, people having self-control problems and being sophisticated turn to rosca as they would indefinitely renegotiate with themselves[10] if trying to save money on their own. This is supported by empirical evidence from a randomized control methodology study in the Philippines. In fact, Ashraf et al. (2004) show women with time inconsistent preferences desire commitment savings devices. They are indeed more likely to take up the SEED product which is a pure commitment savings product (bank account with restricted access to deposits without compensation for this restriction), this leading to higher savings levels. Moreover, Ashraf et al. show that poorly educated individuals with hyperbolic preferences are more likely to join roscas.

Besides rendering the current savings illiquid and safe, roscas restrict the set of future options, as long as the end of the cycle is not reached, compelling the individual to go on saving. Unfortunately we are unable to formally test the hypothesis according to which individuals in our sample would have hyperbolic preferences. However we have empirical evidence which strongly suggests the need of a commitment device. Indeed 89% of the rosca members (198 out of 222), answered that they joined a rosca to discipline themselves to save. "Discipline" or "the willingness to force savings" being by far the most cited answers suggest that a vast majority of members use the rosca as a mean to commit themselves to economize.[11] Despite the evidence we provide in Table 3, according to which all members use the pot for non durable expenses, the answer "buying an indivisible good" came short as only 22.5% of all participants mentioned it as the reason of their membership.

Moreover the fact that 60% of rosca members prefer to receive the pot at the end of a cycle provides an additional argument. Of all those who preferred being at the end 78% said it was because they did not want to feel indebted towards the group. They consider receiving in the early turns of a cycle as a debt towards the group to be repaid by future contributions to the pot and as a situation that they would prefer to avoid (this answer was provided without any proposed list of answers). This certainly confirms the incentive and disciplining role of the group which is exerted through pressure from the peers towards a defaulting member. It demonstrates as well that for a substantial number of individuals, benefits from an early reception of the pot are outweighted by the risks of defaulting and being punished, this shows that sanctions represent an effective threat.[12] In our sample, fear of sanctions is thus an important factor influencing preferences on

[10] At each period, the current self would have present-biased preferences towards consumption and would renegotiate the savings decision made by the previous selves.

[11] Multiple answers could be provided by participants as to why they joined a rosca. Even then we still find that discipline is the most cited motive representing 52% of all answers. There was no list of proposed answers or suggestions to that question.

[12] Groups have different ways of coping with payment problems depending on whether the member in default has already received the pot. Further details on those sanctions can be found in Dagnelie and LeMay (2005).

the timing of pot reception[13] and at the same time, it is a key element for making a rosca a good commitment device. The effectiveness of threatening with observed sanctions provides additional evidence supporting this rationale of commitment device. Would member put too much value on potential sanctions they would quit the rosca and try to save on their own and we would notice high turnovers. But this is not what we observe: the average membership duration of all those who provided this answer is 47 months, and only 4.4% said that they joined the group for a fixed number of cycles (the vast majority not knowing how long they were to stay member). This suggests that members by staying in a rosca deal with the fear of sanctions as if it is indeed a commitment tool. Furthermore many members told us in informal interviews that apart from sanctions, receiving the pot at the end of a cycle provides in itself additionnal motivation to make payments and complete successfully a cycle.

5 Conjectures

Important implications can be derived from the intra-household consumption behavior that we depicted earlier. It allows us to put forward a strong conjecture that we intend to confront with our empirical findings. We claim that each individual makes decision about his/her own consumption and saving. Secrecy protects individual earnings to a large extent from spouse pressure and gives husband and wife a very limited ability to bias his/her partner's choice. In the absence of a common decision over an aggregated household budget, spouses have the latitude to make decisions about their savings as if they were single. They both have the ability to manage their income according to their respective will. This allows us to formulate a conjecture :

Conjecture 1 *The probability of joining a rosca does not depend on whether an individual is single or in a couple.*

A great deal of latitude is left to both husband and wife in terms of managing their income net of public goods expenses and deciding if they are going to join a rosca or not. Thus the probability of joining a rosca boils down to a function of individual characteristics: income, age, schooling, stability of one's job and the number of persons taken in charge. Simple predictions can be made on the effects of these variables. As saving is a normal good, income will positively influence the probability of joining. However we expect that rich individuals would rather opt for a formal and less risky vehicle of savings. A bank account in either a private bank or a public institution[14] offers more flex-

[13]This preference is not correlated to the duration of the group membership and therefore not likely to be related to any learning effect.

[14]The Beninese National Post Service, the CLCAM (a National Co-op offering loans and saving accounts) are among other public institutions present in Cotonou.

ibility and a more secure vehicle than roscas informal arrangements. So for high levels of income we expect the probability of joining to fall having thus an overall inverted-U shape curve with respect to income.[15] Age would also follow a quadratic pattern: the needs to save would be maximum for middle age individuals establishing a family or small commercial activities and would be expected to diminish as age increases. The number of persons one has to take care of has an ambiguous effect on the probability of joining a rosca. A larger number of children would give higher incentives to parents for saving in order to face future indivisible expenses, conversely more children would involve additional expenses and reduce potential savings. Variables describing job's stability[16] would be positively linked to the probability of joining. More stable income entries over the past means that one individual expects to be able to commit themselves more easily to regular payments to the pot.

Should the commitment motive be valid, we would expect rosca participation and rosca contributions to raise with individual income. It is likely however that both of them are concave in income as less risky opportunities become available. Besides we have to admit that this would prove to be a necessary but not sufficient condition for certifying our hypothesis. As income rises agents would tend to further protect themselves against increasing temptations. Moreover, sophisticated individuals would want to overcome time-inconsistencies by restricting their current self facing a wider set of choices available to their future selves. This forms a second conjecture:

Conjecture 2 *At least at low levels of income, payments made to roscas by individuals in need of a commitment device will be positively linked to income.*

In the next section we confront our conjectures with empirical findings coming from our beninese database.

6 Empirical Results

We test our conjectures with our data by estimating participation and contributions with a single procedure: Heckman Full Information Maximum Likelihood[17]. As people self-select their participation to a group, the observations taken into account in the

[15] Our data show that, for the first income quantiles, practically no individual has a bank account contrarily to a maximum of 26% of individuals in the highest quantile.

[16] To check this, we use two binary variables: one takes value 1 if the individual keeps her job for 24 months or more and another one takes value 1 when the individual receives regular wages.

[17] We preferred this technique to Ahn and Powell semi parametric estimator (whose finite sample properties are barely known) as it is likely not to perform better than Heckman FIML in such a sample (around 1200 observations and a level of censoring about 80%). (see Fernández Sainz, Rodriguez-Poo and Villanúa Martín, 1999) Moreover, Ahn and Powell does not produce a 1st step estimate which is of primary importance in our analysis.

structural equation are not a random sample. In fact, we suspect unobserved individual characteristics to influence both the probablility to join and the amount contributed. We have therefore to tackle the problem of selection bias, producing inconsistent estimates, induced by the correlation between the error term and the regressors. Heckman FIML addresses this problem by simultaneously estimating the selection and structural equations, allowing residuals to be correlated.

As FIML rests upon a hypothesis of independence of observations which is not guaranteed by the design of our survey carried in three different areas, we introduced fixed effects removing the area-specific component from the residuals and eliminating the endogeneity caused by unmeasured area characteristics. (Pitt et al., 1999) As errors within those neighbourhoods are likely not to be independent, we used cluster effects taking account of correlation between observations coming from the same environment. This produces robust standard errors which would have been understimated without this correction. Furthermore, the design of our survey was such that the probability of being selected in our sample was different in the three studied areas which could lead to inconsistent estimates. We thus introduced sampling weigths for our estimates to be independent of the sample design. (Deaton, 1997)

HECKMAN FIML ESTIMATES OF PARTICIPATION AND MONTHLY CONTRIBUTION

	All sample			In couple			All sample			In couple		
1st step: participation												
Female	-0.195		(0.180)	-0.056		(0.447)	0.192		(0.653)	-0.054		(0.444)
Couple	0.218		(0.273)				-0.171		(0.210)			
Female * Couple	-0.144		(0.092)				0.401		(0.357)			
Individual income (1000 CFA)	0.008	***	(0.003)	0.006	**	(0.002)	0.008	***	(0.003)	0.006	***	(0.002)
(Individual income)^2	-7.34e-06	***	(2.14e-06)	-5.16e-06	***	(1.68e-06)	-7.43e-06	***	(2.10e-06)	-5.20e-06	***	(1.88e-06)
Female share of household income							-2.099		(1.518)	-2.407		(1.529)
(Female share of household income)^2							1.709		(1.228)	1.981		(1.249)
Age	0.096	***	(0.013)	0.039	***	(0.006)	0.098	***	(0.013)	0.041	***	(0.011)
(Age)^2	-1.03e-03	***	(0.20e-03)	-4.39e-04	**	(1.73e-04)	-1.05e-03	***	(0.21e-03)	-4.53e-04	**	(2.30e-04)
Number of persons in charge	0.023		(0.035)	0.020		(0.041)	0.022		(0.034)	0.019		(0.038)
Primary degree	0.163		(0.671)	0.102		(0.545)	0.160		(0.624)	0.098		(0.503)
Same job for at least 24 months	0.440	***	(0.020)	0.417	***	(0.021)	0.452	***	(0.020)	0.426	***	(0.045)
Salaried	0.299		(0.398)	0.275		(0.478)	0.321		(0.418)	0.317		(0.520)
Ashanti	0.304		(0.274)	0.801	***	(0.261)	0.087		(0.173)	0.608		(0.376)
Fon	-0.160	*	(0.087)	0.140		(0.150)	-0.149		(0.101)	0.165		(0.167)
Goun	-0.099		(0.142)	0.230	*	(0.134)	-0.101		(0.177)	0.241		(0.162)
Peul	0.343	*	(0.192)	-0.339		(0.446)	0.336	*	(0.198)	-0.333		(0.395)
Popo	0.076		(0.158)	0.416		(0.378)	0.067		(0.118)	0.412		(0.350)
Vossa	-0.512	***	(0.077)	-0.584	***	(0.074)	-0.534	***	(0.051)	-0.626	***	(0.051)
Enagnon	-0.626	***	(0.166)	-0.784	***	(0.136)	-0.643	***	(0.156)	-0.824	***	(0.117)
Constant	-3.099	***	(0.549)	-2.013	**	(0.831)	-3.115	***	(0.429)	-1.403	***	(0.210)

2nd step: monthly contribution								
Female	5849.2	(3734.8)	97.5	(748.6)	390.8	(10651.9)	31.3	(879.7)
Couple	-5410.7	(4062.8)			17.4	(10408.7)		
Female * Couple	1429.1	(1477.6)			-778.4	(4855.0)		
Individual income (1000 CFA)	59.5 **	(29.1)	63.8 ***	(22.7)	65.1 ***	(9.6)	68.3 ***	(6.5)
(Individual income)^2	-6.29e-02***	(1.82e-02)	-6.64e-02***	(1.18e-02)	-6.64e-02***	(4.60e-03)	-7.01e-02***	(4.63e-03)
Female share of household income					4763.0	(12958.1)	-631.1	(11694.4)
(Female share of household income)^2					780.5	(11896.2)	5348.2	(13241.4)
Age	-1138.2	(1000.4)	-561.2	(705.9)	-1171.3	(972.5)	-618.6	(811.8)
(Age)^2	12.5	(10.8)	5.8	(7.6)	12.8	(10.2)	6.3	(8.5)
Number of persons in charge	-462.2 ***	(58.1)	-389.1 **	(187.0)	-486.5 ***	(123.3)	-389.6 *	(225.1)
Same job for at least 24 months	-2257.3	(4055.5)			-2487.6	(4351.5)		
Ashanti	-5620.0 *	(3194.1)	-7835.7	(6395.3)	-3445.8 ***	(1027.3)	-6425.5	(4486.3)
Fon	543.4	(2345.3)	-3000.5	(4248.4)	644.4	(2260.0)	-2680.1	(4148.9)
Goun	540.2	(3512.1)	-1737.9	(2732.2)	664.5	(3326.2)	-1454.1	(3036.4)
Peul	-4663.6 *	(2469.4)	2249.3	(6071.5)	-4441.3 **	(2263.2)	3172.3	(6944.7)
Popo	-1062.4	(2151.0)	-2328.3	(5616.7)	-790.7	(1851.3)	-1843.6	(5151.7)
Vossa	7550.5 *	(4319.5)	7374.1 *	(4464.9)	7822.5 *	(4632.1)	7645.3	(5060.2)
Enagnon	4669.8	(4839.6)	4488.0	(4944.3)	4820.1	(5065.3)	4671.9	(5394.1)
Constant	34408.7	(35056.6)	22467.4	(28108.6)	35114.8	(33722.2)	22680.5	(25633.7)
Number of observations	1179		587		1174		582	
Number of censored observations	957		530		953		426	
Number of uncensored observations	222		157		221		156	

standard errors in parentheses,
*** *significant at 1%,*
** *significant at 5%,*
* *significant at 10%*

Table 2: Heckman FIML

The first part of Table 2 gives empirical estimates with respect to participation which is the dependent variable of the first step[18]. We regress alternatively with respect to the whole sample size and then with a subset incorporating only members of a couple. The only difference between the first two columns and the last two is the addition of two regressors namely female share of household income and its square. We control for ethnic affiliation even though we think that it plays a minor role in rosca participation in Cotonou as only a minority of groups are designed along ethnic patterns. These variables can be seen as very rough proxies for social identification and networking. Neighbourhoods are also controlled for and account for all potential interactions and effects specific to Vossa and Enagnon[19]. We include additional regressors such as the number of persons in charge, which is a proxy for household expenses. Since this variable is not significant, none of the interpretations presented before is confirmed. We checked whether education would have any effect: it appears not to have any as the variable 'Primary degree' is not significant for any regression. Stability in one's job, which we measure by whether one has kept one's present job for at least 24 months, affects positively and strongly the probability to join a rosca. Being salaried (not self-employed) is however not significant. The district fixed effects, Vossa and Enagnon, are strongly significant suggesting that unobserved factors specific to each neighbourhood are important. A look at all the regression results also show that ethnic identity is rarely significant which confirms our impression that native language and ethnic filiations are not a strong determinant of rosca participation.

Most importantly, these estimates allow us to validate our first conjecture. In the first column the coefficients displayed show that neither couple nor the interaction variable between female and couple are significant. An alternative regression displayed in the third column confirms these results. Indeed it strengthened the validation of our first conjecture by showing that the variables female share of household income and its square are not significant at 10% controlling for the same individual characteristics. This certainly provides evidence in favour of our framework where the decision to join a rosca is individual and independent of marital status consideration[20].

As anticipated, rosca participation is quadratic in income. However the maximum is reached at a very high level of income indicating that for most of our sample the probability increases in income. Indeed only five individuals out of 1179 have a larger income

[18] Although both equations are estimated simultaneously, for clarity, we will use 1st and 2nd step to refer respectively to the selection and structural equations.

[19] Time spent in a neighbourhood could also represent a proxy for trustworthiness. However problems of convergence with FIML technique prevented us from using this variable. It is to be noted that individuals in our sample tend to have a rather long stay in their respective neighbourhoods with a mean of almost sixteen years: see variable "Number of months same block" in Table 1. Movements across neighbourhoods and migration are more of an exception than usual observation.

[20] We also ran a test of joint significance on coefficients of couple and female * couple. Results do not allow us to reject joint non-significance at a 10% level.

than the maximum of this quadratic function. The income variable used in all our regressions is a measure of individual earned income including transfers. Our inverted-U shape prediction concerning age is also verified, the relationship begins to decrease at 46 years of age. This tends to confirm that demand for indivisible expenditures is increasing among young agents and decreases as they get older[21].

The second part of Table 2 displays estimates with respect to monthly contribution[22]. The dependent variable is the monthly equivalent of the total amount of CFA francs given to all the roscas in which a member participates. Regressors such as ethnic dummies and district fixed effect are overall non significant. Other personal characteristics: gender, age, job stability and female share of household income have no significant effect on contributions. Clearly from our four different regressions only three variables account for rosca contributions: income, income square and the number of persons in charge. These results are all intuitive knowing that both decisions of joining and contributing are independent as we show below. Once an individual has decided to join a group based on her characteristics, she will decide the amount to contribute according only to economic variables. Higher income would potentially lead an agent to save more and thus make larger contributions whereas a very fortunate agent would at some point turn to formal banking and reduce her rosca contribution. Conversely having more children or persons to take care of will reduce savings for a given income and thus reduce payments made to rosca. Rosca contributions are quadratic in income, but the maximum value of its inverted-U shaped curve is this time larger than the highest income value of all rosca members. Income has thus an exclusively positive effect on contribution in our sample and this confirms our second conjecture. Indeed as income increases one individual in need of commitment against temptation or self-control problems will raise the total amount of his contribution.

Empirical results are in accordance with our rationale: secrecy and non-cooperation allow spouses to make individual decisions concerning their expenditures net of public good spending and hence to commit themselves according to their available revenues. The decisions to join as well as to how much to contribute are undoubtedly individual.

Apart from FIML estimations we ran a test on the independence of residuals between both equations (the first and second step). The hypothesis that both equations residuals are independent is not rejected with a p-value of 55% for the corresponding statistic. This suggests that the decisions to join a rosca and the amount one will contribute in such a device are independent. This may be due to the fact that an agent may

[21]Note that 2003 estimates for the life expectancy at birth in Benin is 53 years. (Worldbank, 2005).

[22]Monthly contributions will vary from one individual to another. They often have the choice among several roscas to choose from, each requiring a different contribution. Moreover individuals can decide to belong to several roscas, which is the case for 6% of all rosca members in our sample. Additionally a member can give multiple contributions in one rosca and thus receive the pot more than once during the same cycle. This is allowed in 29% of the roscas in our sample.

have the choice among a set of roscas in his neighbourhood and others known through colleagues, friends or relatives and that the selection among these is made with respect to the amount contributed. Being familiar with other members is the predominant criterion in group selection. Indeed in our sample 68% of all rosca members said that they had selected the group they are in because they knew or had links with other members. The second most cited answer to "why did you choose this specific rosca?" is because its president was known for well managing the group (14%). Following in importance are answers related to the amount of contribution (12%) and the strictness of the rules (10%). Once individuals have identified groups in which they are familiar with some or all members and likely to trust them, they will join the one(s) more suitable to their saving preferences.

It can be argued that rosca participation can influence one's income, not directly since savings placed in a rosca bear no interest but indirectly through social connections or others beneficial side effects and through returns on investment made with the pot. About 26% of all 222 members answer that they experienced some extra economical advantages by participating in a rosca: 18% say that fellow members prefer to buy at their shop or doing business with them and 6% say that they have met their employer (past or present) in the group. These answers tend to confirm that roscas provide social connectedness and that they can bring additional advantages. However measuring the importance of these side effects is practically impossible. To account for such potential benefits on income and thus endogeneity with respect to the probability of joining a group we have carried out the same regressions as in Table 2 by replacing income with expenses on non durable goods (mainly food and other weekly expenses such as gas for cooking, transportation, etc). This way we instrument income by a variable which can be considered as independent of such extra benefits. Results from these regressions are similar to the ones we obtain and also confirm our two conjectures.

7 Other Reasons for Joining a Rosca

While we think that the need of commitment device represent the main motive explaining rosca participation in our sample, literature has provided other motives for joining.

7.1 Quick Financing of the Purchase of Durable Goods

As argued in Besley, Coate and Loury (1993), roscas allow individuals to receive the pot earlier than through individual savings and thus to buy the desired indivisible goods before it would have been possible 'in autarky'. This of course being the case for all members except the last one in the cycle. Ex-ante roscas having a non-predetermined order, either because they are bidding or random type roscas, make all members better

off in expectation by saving through them. Once the indeterminacy of the entire cycle order is unraveled the last is ex-post worse off presuming that the saving rate imposed by the rosca is not optimal for him. Observations collected in Benin do not support such hypothesis. Out of the 183 roscas included in our dataset 50% have their entire order known before the cycle begins, before any cotisation has been paid. In those cases, when the cycle starts there is no uncertainty about the timing of the pot reception. Either the order is determined by the governing body in a decision rosca according to various reasons (ponctuality, good payment records, seniority, member of the governing body, etc). Either in a random rosca the entire order is chosen randomly and known at the beginning of the cycle. Thus as the cycle starts, the median cycle length being 11.54 months, the last recipient could well decide to opt out ex-ante knowing to be worse off. Backwards induction would then predict the breakdown of the rosca.[23]

Another piece of evidence rendering the Besley, Coate and Loury (1993) reasoning unfit to the Beninese case is that only a minority of 24% of rosca members in our sample declared that if they could choose they would prefer to receive the pot at the beginning of the cycle while a majority of rosca members (60%) preferred the end.[24] For those wishing for an early reception of the pot we do not rule out the Besley, Coate and Loury rationale but it remains that this motive is more of an exception.

While the quick financing rationale is unfit for our data, saving through these associations is done in order to make an indivisible expense. As displayed in Table 3, this appears to be the case from our investigations even though as evoked before, it is far from being the most mentioned motive for joining a rosca[25]. We proceeded by asking all rosca members what they did with the pot during the present cycle or what they intended to do with it if their turn was to come. Nearly all of them reported that they bought or were willing to make an indivisible expense: 49% mentioned investment in their small business (buying important stocks of provisions for stores, motorcycle or car repairs for taxis, equipment for fishing, etc), 18% planned to repair or build a house, 11% reported lot purchasing, 7% paid for school tuitions [26]), 5% planned to reimburse a

[23] In our sample, 93% of all roscas change the order after each cycle is completed. That is to say the order of pot reception is rarely repeated from cycle to cycle. But this does not change our argument. For half of the roscas having no uncertainty with respect to the order, members motivated by an early reception of the pot can still decide to opt out, whether or not the cycle order will be repeated.

[24] 6% declared prefering to receive the pot at mid cycle and 12% were indifferent. Of those prefering to receive first in the cycle: 61% said that they would rapidly invest the pot and ease the payment of future contributions with the profits earned, another 25% said that they could rapidly repay debts or enjoy the benefits of having the pot.

[25] Contrary to Gugerty (2003) who finds that more than half of rosca participants in her kenyan sample use rosca winnings for two or more purposes, offering thus evidence that roscas are not formed solely to purchase lumpy durable goods. We observe that only 14% of rosca members intended to use the pot for more than one purpose. For details, see Table 3.

[26] The fact that school fees represent such a low percentage is explained by the fact that a majority of

	All members	Women	Men
Don't know yet	0.02	0.01	0.03
Tuition fees	0.07	0.06	0.07
Health expenses	0.02	0.02	0.02
Financial aid / debt	0.05	0.07	0.02
Luxury expenses	0.05	0.08	0.03
Party / funeral	0.03	0.02	0.03
Brideprice	0.00	0.00	0.01
Lot purchase	0.11	0.10	0.12
House repair / building	0.18	0.08	0.26
Small business	0.49	0.72	0.30
Travel expenses	0.02	0.01	0.02
Other durable good	0.14	0.03	0.23
Other	0.02	0.03	0.01
Number of observations	222	97	125

Table 3: Pot Uses (multiple answers)

personal debt and 14% to buy a durable good. What is meant by "other durable good" is any type of object or commodity such as tv set, radio, mobile phone, etc.

Incidently if we look at answers provided by women, we find that 72% of them made (or intend to) an investment in their business[27]. Men's answers are more diversified, they mainly use the pot for business, house repair or building, other durable goods and lot purchase. One can notice the significant difference between male and female expenditures on small business, other durable goods[28] and on house repair and building which is likely related to the customary expenses pattern.

Besley and Levenson (1996) tested a hypothesis according to which, controlling for income, the rosca members would possess more durable goods than non members. We ran similar tests on the durable goods possessed by the households (such as fridge, freezer, stoves, tv set, vcr, stereo system, radio, bed, clock, watch, telephone, mobile phone) but obtained no significant differences between members and non members. A

public schools ask for very small tuition fees. For other selective schools, flexibility is allowed by which high fees can be paid in several instalments.

[27]Despite the fact that profits from these investments may eventually benefit the household, this statistic does not coincide with the notion that women would join a rosca in order to save primarily for their children or the household's well-being.

[28]The large difference between "small business" and "other durable good" with respect to men and women is likely to be exaggerated since answers provided by a proportion of men could be counted in both categories.

look at Table 3 tells us that a large majority of pot uses do not lead to durable goods purchases for the household, for which we tested the Besley-Levenson hypothesis. Indeed durables purchases appear in the categories "other durable good" or "luxury expenses", which represent only 19% of all pot uses. The majority of pot uses being targeted towards indivisible expenses do not translate into accumulation of such goods.

7.2 Insurance

Another motive for joining a rosca is that such an association can act as a substitute for insurance. This interpretation is mainly valid for the case of bidding roscas and not for random or decision roscas. Bidding roscas is indeed the type of rosca which can accomodate best the allocation process and the timing of pot reception with respect to member's specific shocks. In our sample only random (64%) and decision roscas (36%) are represented, bidding roscas being seemingly absent in Cotonou. However random and decision roscas can provide insurance to a small extent. Indeed some flexibility is provided by allowing a member in need to receive the pot at an earlier round. Of all the roscas surveyed 26% stipulated in their rules that changes in the ordering was permitted and to be agreed upon by either consensus of all members or by the governing body. Moreover 44% of all roscas allow two members to change order without knowledge of the rosca's governing body or any other member. This opportunity seems to be used since 12% of the rosca members said there has been at least one exchange of place with another participant in their group during the last cycle.

Roscas can also provide insurance by offering loans to their members. Indeed 20% of all roscas offer this possibility in their rules. In the vast majority of those associations (94%) a loan can only be offered to a member who has not yet received the pot. On top of that, conditions are often imposed (72% of groups) as for what reasons the loan can be granted (sickness, financial problems, funerals, accidents, etc).[29] Loans were regurlarly solicited in groups offering this opportunity : during the last six months 58% of them granted at least one loan.

Decision roscas, both those imposing an order for the entire cycle and those making meeting-to-meeting decisions often consider desires and needs of members. Of all 65 decision rocas, 53% base their decision on each individual member's needs.[30] Of course this insurance aspect is enhanced for roscas based on meeting-to-meeting decision. A member to whom something unexpected happened and who has not yet received the

[29] In all cases no formal collateral (such as belongings) is required. The pot to be received by this member acts as such. Indeed the amount granted is often limited to the pot and deadline payment coincide with the time of pot reception or the end of the cycle. 58% of these loans are granted without payment of interest. Before granting a loan 72% of all roscas carry on investigations to check the truthfulness of each demand.

[30] Other criteria for such a decision are : good payment records and punctuality (30%) and seniority (11%).

pot can come to a meeting and formulate his demand. For roscas fixing the entire ordering before the cycle begins the insurance they can provide is limited. It can only take into account foreseen or potentially known shocks. For instance, they can take into account harsh fishing seasons and make pot reception for fishermen coincide with it.

Even though these two types of roscas have tried to accomodate some insurance aspects in their functioning, once the pot is received and a shock occurs, there is little if nothing available.[31] Roscas are therefore an imperfect substitute for insurance.[32] Instead surveyed Beninese tend to resort to indemnity funds[33], a major informal institution for insurance services.

7.3 Intra-household Conflicts

Anderson and Baland (2002) present a model of intra-household conflicts in consumption decisions. In their cooperative bargaining framework there are asymmetric preferences for household goods regarding men and women who share a common budget. They model a conflict within the household for an indivisible good based on those asymmetries : women having always a larger preference for the indivisible good and therefore willing to save at higher rate than men. Members being an overwhelming majority of female[34], as they observed in Kenya, would join a rosca in order to render savings out of reach of their husband (or hiding them) and buy an indivisible good which they prefer. Whereas men would rather opt for present consumptions. By joining a rosca, women thus commit the household's income against the husband's preferences.

This however does not seem to comply with the evidence we collected in Benin. On the one hand, our dataset shows that women have a slightly smaller probability of being in a rosca than men: while they represent 51% of all adults, women form a minority (45%) of all rosca members. In Cotonou the probability that a woman participates in a rosca is 15%, this slightly increases to 21% when she lives in a couple and 22% if she works (24% if she does both). Compared to that men have an overall probability of 19% of participating in a rosca, 32% when they live in a couple and 31% if

[31] Some roscas do offer additional help called "alô jè nude ji hun enan" (24% of the roscas in our sample). One member in need can raise her hand and tell the group which kind of problem she has to cope with. The group might give her a financial help which needs not be reimbursed. This help is closer to solidarity than insurance since its granting is uncertain and its amount widely variable.

[32] Contrary to our field observations, Calomiris and Rajaraman (1998) find a prevalence of bidding roscas in an Indian city and stress their insurance role. See also Klonner(2001)

[33] LeMay (2005) presents an analysis of those groups based on this Beninese household survey. These groups, called in Fon "nujè mèji gbê" (a direct translation of which would be "happiness-unhappiness funds"), offer insurance against a wide range of shocks.

[34] This bias towards female participation is also confirmed by other studies such as Ardener (1964) - offering several case studies located in India among others - Geertz (1962) and Tsai (2000) who respectively focus on Java and China.

working (35% if both). There is also no tendancy towards favoring women in group composition: 18% of all roscas surveyed were exclusively composed of women while 26% exclusively of men. For the remaining of groups composed of both genders 63% have a majority of male members. Moreover from the general groups' anatomy that we can depict from this large scale survey we cannot assert that roscas are primarily oriented towards women's needs neither do they intend to favour their membership. We met no group having clear primary objectives such as assisting women, providing for their needs or those of children or enpowering women in their interactions with their husband. [35] This is confirmed by the coefficients we obtain using the Heckman FIML displayed in Section 6. Indeed neither female nor female * couple variables are significant[36] in the first step of our regressions. This showing that gender does not seem to be a relevant variable explaining participation to roscas. Combined to that, these variables are still non significant in our second step estimates. This would tend to show that household's members seem not to exhibit asymmetric preferences with respect to saving decisions.

On the other hand, were roscas used as a mean to put money aside from the husband, membership would have to be kept secret from the husband's knowledge. In our sample, most roscas meetings are only open to members but groups do not insist upon secrecy showing that participants are not primarily seeking to commit money against spouses. Indeed only 15% of the membership due to people living in a couple (71% of all rosca memberships) is unknown by spouse.[37] In order to avoid potential disputes concerning mainly adultery issues, 40% of groups allowing female membership impose husband's approval for new female members. Moreover 56% of the groups organize at the end of a cycle (or of the year) a celebration with dances and folklore where friends and neighbours are invited. Even defiles or marches preceed those celebrations to attract attention from people in the neighbourhood. It can also serve to advertise the success of their association and generate new memberships.

One could still argue that roscas would be a tool for hiding revenues to one's partner. This could be the case for a minority of members as 29% of them declare the contributed amount to the pot is unknown to their partner while 54% of them say the time of receiving the pot is not known. Although roscas could be a tool for helping secretive partner in hiding money, these figures do not suggest it would be a widespread motive

[35] Neither did any group attempt to elaborate a strategy of expense for their members in order to favor any gender or ethnic group. In fact no group imposed spending scheme or favored goods deemed valuable to them. Latitude as to what can be bought with the pot is large: rules limiting the pot use are rarely imposed (in only 2% of all roscas).

[36] A test of joint significance run on female and female * couple variables prevents us from rejecting joint non-significance of these variables at 10%.

[37] Gugerty (2003) finds similar evidence. In her kenyan sample roscas have a structure that is not designed to encourage secrecy among spouses. Gugerty also presents evidence against the intra-household conflict hypothesis.

for joining a rosca[38].

7.4 Alternative Explanations

A view that can also arise from our framework is that roscas would simply be used to help spouses reducing their contribution to the provision of public goods for the household by putting money out of reach. In this case we would expect the probability of joining to increase with the expenses on public good that the household has to face. The variable number of persons in charge is a good proxy for such public good expenses. This rationale is however not supported since in all of our regression results this variable is largely non significant. It is not that we discard entirely this interpretation of rosca participation but we clearly give it a lesser value than our main argument of commitment device against self-control problems.

A significant proportion of members we interviewed, declared that it was impossible to save money if they were to leave it home (see also Anderson and Baland (2002)). Indeed, it would disappear in various expenses. Savings would quickly evaporate due to all sorts of social pressures and demands coming from the entire family, friends and neighbours. Ranging from financial help for a friend, payment for medicines for an uncle, to unexpected claims by children, financial help can be requested on a regular basis. Demands could as well come from the spouse and roscas would help agents to commit against those claims, but the household budget structure and secrecy are such that this kind of claims is greatly reduced. By opting for a rosca, one opts for a socially accepted alibi to protect one's savings against all types of social pressures. This was also observed by Platteau (2000) and was developed by Ambech and Treich (2003). In our sample, 20% of members mentioned that they joined a rosca for protecting their savings. That can mean two things that can not be discriminated: on the one hand, protection against potential income sharing and social pressure from relatives. But on the other hand, it can also mean protection against risks of theft, fire or other catastrophies which were also evoked during informal interviews. To reduce risks people would prefer not to save at home and put money out of reach in a rosca which would serve as a mean to protect earnings against such adversities. Far from being the most important answer explaining members' participation, which is as we show commitment against self-control problems, the fact that one out of five members emphasizes protection certainly gives credit to this alternative rationale.

[38] In fact this answer was not given by a single of the 222 members in our sample to the question: "What is the fundamental reason why you joined a rosca?".

8 Conclusion

Our empirical evidence shows that rosca participation is not a gender issue in Cotonou and that the decision to join a rosca is made individually in a such a way that each spouse retains the control over his/her spendings. This has to be taken into account by policies that would be designed to favour any gender participation. Recent studies have stressed the fact that roscas are used as a commitment device against two categories of potential threats. Individuals would join roscas to protect themselves against external threats such as pressure from their spouse coming from asymmetric preferences (Anderson and Baland, 2002) or social pressure (assistance to relatives or friends) as emphasized by Ambec and Treich (2003). Alternatively, agents would like to secure their income against internal threats such as temptation and present-biased preferences, both preventing them from saving, which is detrimental to their long term well being. Our investigations underline that rosca participation in Cotonou is primarily aiming at protecting members against their self-control problems. Despite the fact that we did not include direct questions on time inconsistency over preferences in our survey, our results suggest that self-control problems are widespread and that people in the poor districts that we surveyed value savings commitment mechanisms such as roscas. Indeed the willingness to discipline savings came out as the most expressed motive among roscas members. Projects favouring the establishment of formal saving and commitment vehicules in Vossa and Enagnon, and certainly in other poor districts of Cotonou would most probably meet with success.

9 Appendix

9.1 Survey Methodology

We selected households according to a random process. In Enagnon we succeeded in obtaining a map of the city and performed a simple selection of a lot according to an implemented random process. In these two districts it often happens that many households live on the same lot in semi-detached rooms. Enumerators selected one room on a lot according to a clock-wise selection varying from lot to lot (for the first lot of the day they selected the first room clock-wise, for the second one the second room clock-wise and so on). In Enagnon-plage and Vossa we used a pseudo-random process by which every tenth lot according to a specific direction was picked and then room selections were done in a similar fashion as in Enagnon. Overall only 3 households categorically refused to be surveyed and were replaced by other randomly selected households. Enumerators were asked to pass several times and at different moments of the day, until contacts were established in such a way that none of the selected household was skipped. The most qualified of our enumerators also acted as a supervisor and visited

many households already interviewed in order to check the accuracy of the responses. Other than that we analysed every completed questionnaire closely. Several appointments were held with each team of enumerators and in case of incoherence or lack of answers we regularly sent them back on the field. Questionnaires often needed successive rounds of checks until final approval. As mentioned above we emphasized the fact that the interview with every single household member had to be carried in his/her sole presence in order to get as precise and reliable information as possible. Fear of divulging information in front of other members would have led individuals to lie or to refuse to answer. On average our four teams of two enumerators completed two questionnaires a day. The taking account of intra-household secrecy greatly lengthened the survey by requiring specific appointments with each adult member. Another time consuming factor was the detailed part of our questionnaire concerning groups: we often needed more than an hour for a single group. We compensated every household for their precious time by donating 1500 francs CFA. Finally, with two previous missions, in 2002 and 2003, we carried out about eighty group interviews. We attended regular meetings or met members of their governing body in order to get a better understanding of their functioning.

9.2 Definitions of Key Variables

Live in couple: Individual having a partner (married or not) who is member of the household. Those who were engaged in a couple for whom the spouse was not living in the household and for whom we did not have any data were not considered to live in couple.

Salaried: Individual is salaried if he/she receives a salary on a regular basis (either daily, weekly, bi-weekly, monthly, bi-monthly, etc) in the formal or informal sector. Only 12% of all individuals are salaried and there is an important gender difference: 22% of men are salaried and only 3% of women. Women are massively self-employed in our sample.

Individual income: Monthly sum for each individual of all income-generating activities including those from formal and informal sectors and those from self-employed activities. It also included earnings from interest on loans made, rents on house or apartment and received transfers. In our overall sample only 10% work in the formal sector, being either employed privately or by the state.

Number of persons in charge: Total number of people within the household depending financially on either member of the head couple. It is thus the sum of children (aged less than sixteen years), young adults having no revenues or any other depending relatives. For example a member of the extended family moving in the household and relying on its members for a living is counted as such.

Job length: Indicates that one individual has had his/her present principal income generating activity for at least twenty four months.

Primary degree: Indicates that one individual has completed primary school.

Individual share in couple income: Each individual's income divided by the sum of both spouses'income.

Expenditures: Monthly extrapolations from the sum of all expenditures made on non durable goods during one week. It includes 1) all expenditures on food (including expenses on heating and cooking such as coal or gas) and 2) luxury expenditures such as cigarettes, alcohol, eating and drinking in hotels and restaurants.

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