Interest rates in community-managed microfinance: How the poorest Africans earn sixty percent return on their savings

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Interest rates in community-managed microfinance: How the poorest Africans earn sixty percent return on their savings

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Abstract: It is common to see the interest rate on savings in community-managed microfinance being reported as "20-30% annually". Using panel data from 204 groups in Malawi, I show that the right figure is likely to be at least twice this figure. This is due to sector-wide application of non-standard interest rate calculation and unrealistic assumptions about the savings profile in the groups. In the 204 groups, the annual interest rate on savings is 63%. For transparency and accountability donors, politicians and practitioners should change their interest rate calculations. Furthermore, the proposal method will allow practitioners to better monitor group performance.

Keywords: Microfinance, interest rates, performance monitoring, community-managed microfinance, village savings and loan associations, Malawi, NGO

JEL: M40, O16, Q13, G21

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Introduction

The weekly magazine The Economist has called savings groups "the hottest trend in microfinance" (Economist, Dec 2011). Indeed, community managed microfinance groups, or savings groups, are the focus of increased attention and the number of groups has risen sharply in recent years (Hendricks and Chidiac, 2011; Wilson and Harper, 2010). There are currently at least 65,000 groups with more than 1.5m members worldwide, counting only the groups that report data to the portal savingsgroups.com.[1] Other sources find three times as many (VSL Associates, 2011). If the savings groups reporting on savingsgroups.com were a microfinance institution, it would be the 9th largest in the world and the 2nd largest microfinance institution in Africa with regard to total number of savers.[2] The attitude of practitioners and academics involved in microfinance toward these small local microfinance entities normally falls into one of two categories: ignorance or praise. A result of this bifurcation of attention is that the savings groups lack critical treatment. Fortunately, this is about to change, with several large scale impact assessments under way in 2012. But critical reflection is more than impact measurement. Within the realm of savings groups there is no clarity on two fundamental metrics, which would be required for any other microfinance initiative: The interest rates on savings and loans. In the article in The Economist quoted above the following line appeared:

> "...and returns on savings are extremely high—generally 20-30% a year. Borrowers typically pay interest rates of 5-10% a month on loans that usually have to be repaid within three months."

[1] This leaves out the Indian Self Help Groups, which have some 33m members. They are left out due to their common dependency on government loans.

[2] Based on data from MixMarket in Dec 2011. The largest institution in Africa is Equity Bank in Kenya with 5.4m depositors and number three is ACSI in Ethiopia with 1.16m. Worldwide the list is: BRAC(Bangladesh, 8.0m), ASA (Bangladesh, 6,6m), Equity Bank (Kenya, 5.4m), BCSC (Colombia, 5.0), Rural Development Bank (Sri Lanka, 3.7m), Caja Popular Mexicana (Mexico, 3.5m), Bandhan (India, 3.3m) and Khan Bank (Mongolia, 1,6m).

The sentence reflects current practice in the field. An immediate, although easily correctable, flaw is that the two interest rates are not directly comparable as they do not cover the same period. To compare monthly and annual interest rates, we need to adjust one of them. As such, a ten percent monthly interest rate is 245% annually.[3] Here we arrive at the more fundamental issue: The two interest rates are very different: two hundred and forty-five percent on loans but only 30% on savings, i.e. a difference of 215 percentage points. This would be fine and understandable if not for the fact that the interest rate on savings is directly determined by the return the groups get on loans. If indeed the numbers were true, a return equal to 215% should disappear in the groups. The key point below is that the numbers are incorrect.

In this paper, I analyse the interest rate in savings groups using standard interest rate metrics. I find that the interest rate on savings reported is usually wrong by at least a factor of two. It should be doubled to be correct. The global average of 35% annual returns on savings in savings groups is thus more likely to be 75%. To arrive at this result, I look at data from 204 savings groups with 3544 members in Malawi and find that the average returns to savings is not 29% as reported by the commonly used metrics on these very groups, but 63% using standard metrics. When it comes to the interest rate on loans, the typical nominal interest rate seems to be 10% per month, or 245% per year. In my sample it is more likely to be 500% annually, because the monthly interest rate is 20% in half of the groups. Due to the self-financing of the groups, this might be reasonable, but hardly "negligible" as some have claimed (Allen and Panetta, 2010: 2). Furthermore, using the new figures on interest rates, I show that some money is missing

[3] The formula used is $r_{annual} = (r_{fourweek} + 1)^{13} - 1$, where r_{annual} is the annualised interest rate, $r_{fourweek}$ is the interest rate per four weeks, in this case 10%, and 13 is the number of four-week periods per year. This formula and others are further explained later.

in the books of the 204 savings groups, and I suggest three reasons as to why this might be the case: first, the repayment rates might be lower than reported. Second, groups might use very relaxed repayment schedules in the groups. Or third, funds might simply be stolen. If savings groups are to be taken seriously in the future, this must not go unexplained.

The paper progress as follows: in the next section, I explain why I think savings groups should not be exempt from following standard financial calculation of interest rates. I then diagnose the problem of faulty calculations in the groups. Then I look at data from 204 groups to compute the effective interest rate. To enable easy use of the findings, I present an easier method for calculating the interest rate and show that the method is superior to the simple method currently in use. Both of the new methods find a large gap between the charged interest and the accumulated funds, which I then discuss. I conclude the paper with recommendations for donors, developing country policy makers, practitioners and researchers. Apart from the positive message that interest rates on savings are twice as large as we thought, my primary recommendation for all is to acknowledge that the proper way to put a price on money in time, i.e. to calculate interest rates, is using the standard financial calculation in Annex 1. In situations where we cannot use this calculation, we should use the best possible approximation.

Are savings groups different?

Savings groups are groups of 15 to 25 people who are taught how to manage their own funds. Their precise way of working is carefully described elsewhere (Allen and Panetta, 2010; Allen and Staehle, 2007), but typically savings are done on a regular basis, e.g. weekly, and the saved capital is lent out to the group. Loan duration is for

example three months and all the groups' assets are shared out once every year according to the individual level of savings. These groups are usually not regulated, and people working with savings groups commonly refer to them as being 'under the radar' of national supervision. Some perceive this as an advantage, whereas others point out that the fact that the groups are under the radar enables them to avoid legislation about information for consumers, in particular the interest rates on loans and savings (Rhyne and Rippey, 2011). Partly because of this, interest rate calculations have not followed the standards and practices used elsewhere. In the next section I will discuss why standard financial calculations should be followed, even for savings groups.

One argument against standard interest calculations is that it will not be understood by participants. Certainly, the central purpose of the metrics analysed below, like return on assets, is internal monitoring and thus it must make sense locally. But even savings groups operate on the market for finance. In Portfolios of the Poor, Collins et al. (2009) demonstrate that very poor people have active financial lives and use a plethora of financial instruments, often more than nine at a time. A savings group is one such instrument and thus clients, governments and donors should be able to compare this instrument with others. In other words, the interest rate calculations must be *externally consistent*. As the number of savings groups increases, the need for comparable information increases and external consistency becomes more and more important.

Even practitioners who support the argument that savings groups are special and therefore choose to ignore global interest rate calculation standards have reasons to care about the results below. This is because the new method is better for monitoring performance in the groups. As mentioned, savings groups market

themselves with a nominal interest rate of ten percent. The only funds lent out by savings groups are the savings from the group itself. If savings are lent out at ten percent per month, savers should in principle be able to take away ten percent per month. This is only correct in principle, since many other things happen along the way. But people working with savings groups should be able to account for the difference between interest rates on loans and savings. This can only be done if the metrics are *internally consistent*, i.e. when interest rates on savings and interest rates on loans have the same meaning and are comparable within the reporting system. As such, standard financial interest calculation would not just make the interest rates externally consistent, but would also ensure internal consistency.

Non-standard interest rate calculations

So what is wrong with the interest rate calculations in use when discussing savings groups? There are two issues: First, the interest rate calculation itself and second, annualisation of this rate whenever groups are less than a year old. I go through these calculations below.

Interest rate calculation

The calculation used for annual interest rates in the management information system developed by CARE, Oxfam, and CRS as well as on savingsgroups.com is this:

$$\text{Returns on savings} = \frac{\text{Net profit/loss}}{\text{Cummulative value of savings}} \quad (1)$$

In this paper, I call this the simple method. To see how this calculation is done in practice, let me use an example. Imagine a group that starts saving on January 1st 2010. During the next year, all members save 1000 shillings in total. Because the group lends

out the money along the way, the savings generate a return. On December 31st, the group has a total of 1100 shillings, or a profit of 10% which the group distributes among the members. Following the formula above, the group has made a 10% annual return on savings. At the face of it, this calculation might make intuitive sense. But intuition is sometimes misleading. To illustrate the pitfalls, let me look at two other groups and add some knowledge of when they save, i.e. their savings profile. Both of them save 1000 shilling and end up with 1100. In the first group, Group A, everyone saves everything on January 1st. The members have to live without their 1000 shillings for the entire year. The other group, Group B, postpones saving until December 1st 2010 at which time it saves 1000 shillings. The members of Group B must get by without their 1000 shillings for one month. On December 31st both groups have total assets of 1100 shillings and profits of 10% of their cumulative savings. The groups' savings profiles are exemplified in Figures 1 and 2 for illustration.

The subjected to the calculations from above both groups yielded an interest rate on savings of 10%. As should be clear from the two examples, though, the interest rate on savings in the groups is not the same: in Group A, members get 100 shillings in profits when they save their money for a year. In Group B, they get the same in just one month. Clearly, Group B yields a higher interest rate. Following financial interest calculations, the annual real interest rate would be 10% for Group A, but 214% for Group B.

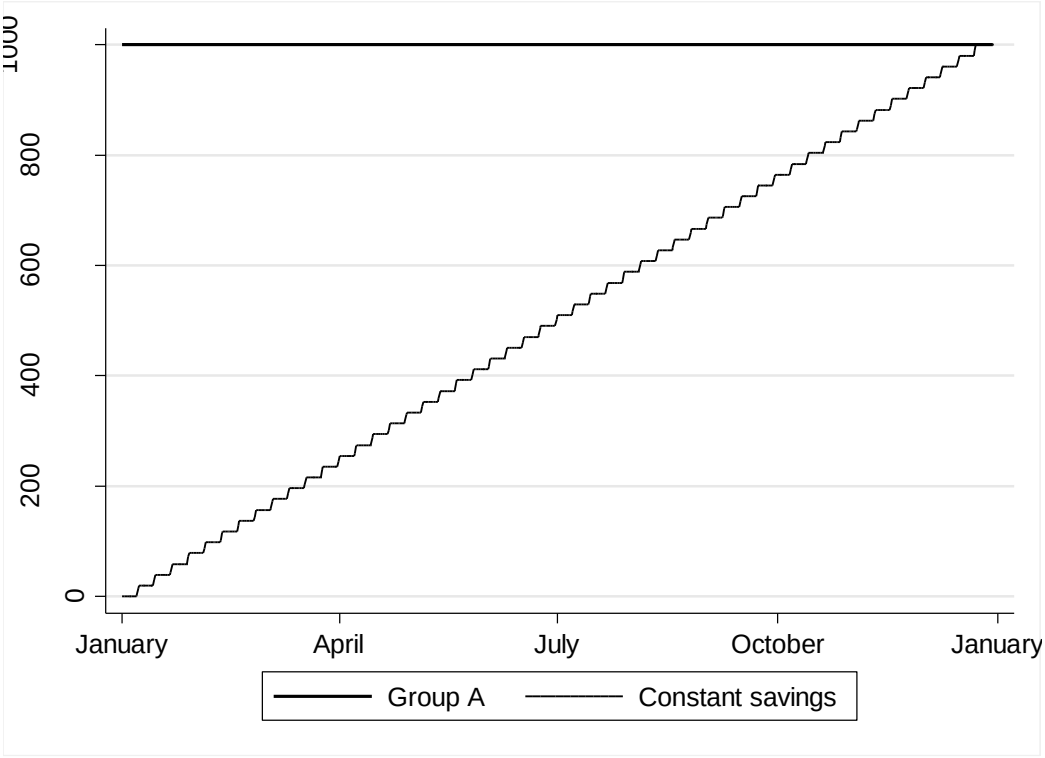

Figure 1

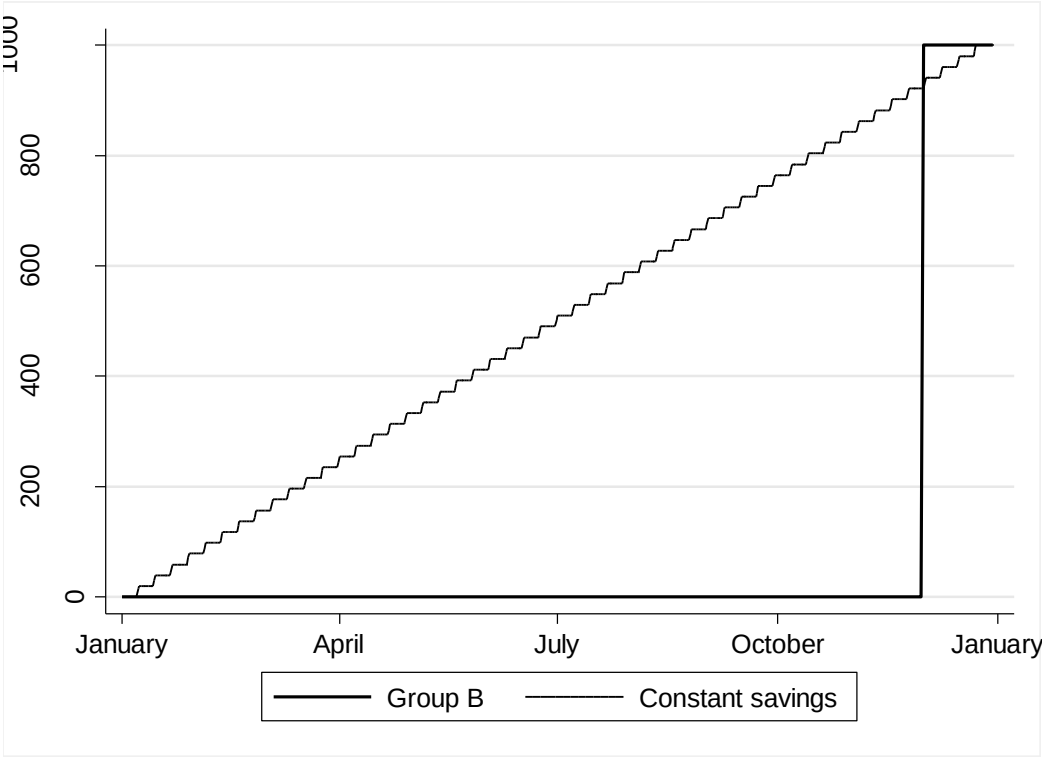

Figure 2

The central point is that the savings profile, i.e. the timing of savings, matters greatly to the interest rate when we want to use the generated profits as a basis for calculation. To calculate the interest rate, we must assume a savings profile. For the present purpose, this raises two questions: What are the assumptions about the savings profile in the formula above, and what might the real savings profile be in savings groups? The assumption about the savings profile using the simple method is exactly as in Group A: The only case where the formula is correct is when everything is saved in the beginning of the year and kept in (and lent out by) the group until payout at the end. Turning to the second question, Group A's savings profile is not realistic in savings groups simply because of the way the groups work. Savings is done by purchasing so-called shares in the groups, and members are strongly encouraged to buy at least one share, but internal rules prohibit them from buying more than five shares per week. In an extreme case, one could imagine that a group would save most in the beginning and least at the end. An example is Group C in Figure 3. This would still not be close to the savings profile assumed in the calculation above and whereas savings might vary over the course of the year, even this profile is unlikely in reality. Indeed, in the data below, where I look at 204 groups from Malawi, the best crude approximation is that saving is constant: Members save a little every week.

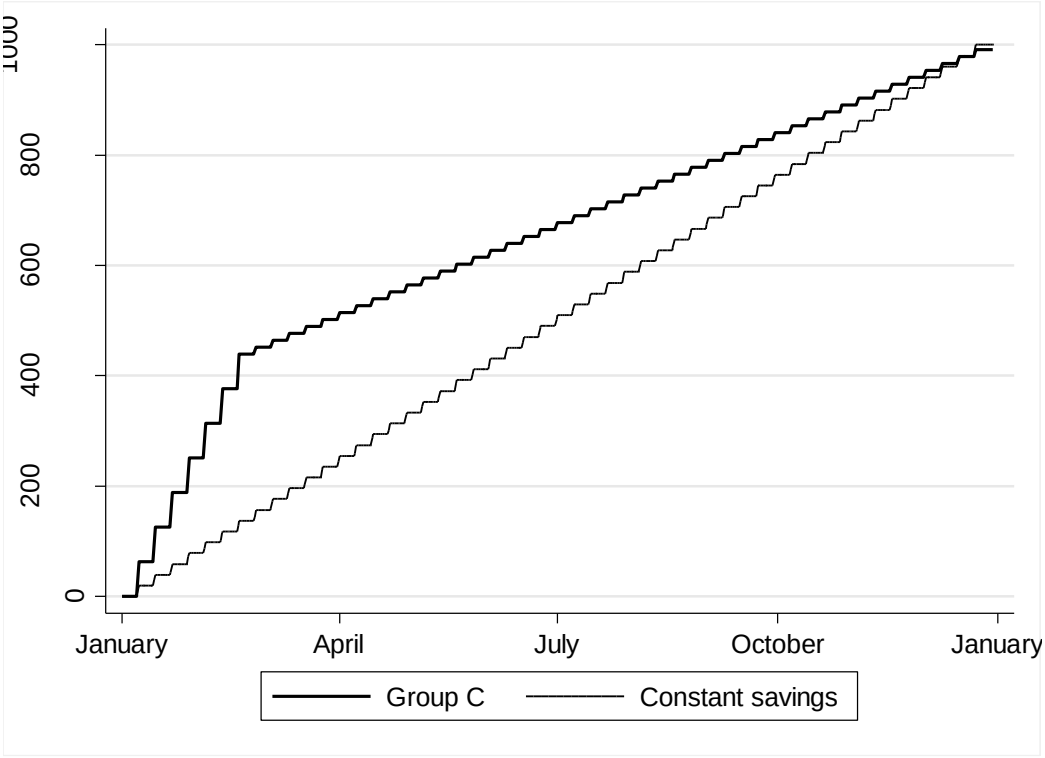

Figure 3

Annualisation

The second non-standard calculation is annualisation. The management information system uses the following formula for annualising the interest rate:

$$\text{Annual interest rate} = r_p * \frac{52}{n} \quad (2)$$

where r_{period} is the period interest rate and *n* is the length of the period in weeks. This formula gives an annualised return, which is much lower than ordinary interest calculations would suggest because the calculation ignores compounded interest, i.e. interest on interest in groups that are less than one year of age. But in savings groups, paid back interest enters the loan fund as all other capital and is then re-lent. So

compounded interest matters.[4] Since data collection in savings groups typically happens every quarter, the group might be 3, 6, 9 or 12 months old.

The standard formula for calculating the annualised interest from the available data would be to first calculate the weekly interest and then annualise. The formulas are:

$$r_{week} = (r_{period} + 1)^{1/n} - 1 \quad (3)$$

$$r_{annual} = (r_{week} + 1)^{52} - 1 \quad (4)$$

To exemplify, imagine four different groups of different ages, e.g. 13, 26, 39 and 52 weeks (see Table 1). Imagine that we collect data for all four groups at one point in time, and we find that all groups have earned 27% interest until now. In other words, r_{period} in equation two above is 27%. Of course, group one has been the most effective group at accumulating interest and group four the least effective, due to the difference in age. But the statistic we are interested in is the annualised interest. Notice now the difference in methods of calculation:

	Age at data collection	Financial annualisation	Simple annualisation
Group 1	13	157%	107%
Group 2	26	60%	53%
Group 3	39	37%	36%
Group 4	52	27%	27%

Table 1

For the first group, the annualised interest using simple annualisation is 107%, whereas standard interest calculation makes it 157%, a difference that illustrates the importance of proper annualisation. On savingsgroups.com the average age of groups is 13.2 months, which is close to one year. This means that the non-standard annualisation

[4] Indeed, for the calculation to be correct compounded interest should be taken into account even if it is not a characteristic of the underlying asset.

probably does not matter much for the missing money, but some groups are younger and the management information system should work for groups of all ages.[5]

A relevant question is whether a weekly interest rate is more meaningful as a metric of efficiency than an annual interest rate. In ordinary microfinance, there is a good argument for adopting a monthly interest rate, since loans are typically short, i.e. three months and the annual perspective is less relevant. In VSLA, however, savings often happen over a year. In terms of comparing interest rates, it will not make much difference as long as it is the same time period, but for this reason I continue using annual interest rates below.

Data on interest rates and savings profiles

As mentioned in the previous section, the savings profile is essential when calculating the interest rate. Certainly, the savings profile assumed by the formula currently used to compute interest rates is unrealistic. But what, then, is realistic? To answer that question, we must turn to data. The data I use here are collected every three month and contain information on total savings, total assets, group age and more. Because of the multiple time points, the data give an indication of the savings profile. More time points would give more precise information. In effect, the data tell us about the overall interest on savings in the groups. After an overall description of the data, I compute the real interest rate using standard financial calculation. Then I compare these calculations with two approximations: the current simple method and a calculation assuming constant weekly savings.

[5] If there is large variability in the age of the groups at savingsgroups.com, the non-standard annualisation would affect the calculations, since the error is biggest for young groups.

The data

The initial data encompass 974 groups. The groups are observed every three months so most groups have more than one observation. To provide information on the savings profile, I need multiple data points, so I exclude the groups with less than four observations. That leaves 239 groups, which have been observed during the course of at least a year. Following common practice in savings groups, the groups distribute all funds once per year at the end of a so-called cycle. After one cycle, it is common to start again with an initial larger savings contribution from all members. Since I do not have precise data on the funds involved in the distribution, I limit the analysis to one such cycle and since I also lack information about any initial savings, I use only first-cycle groups. Some groups started saving before the data collection began and thus the four observations might overlap two cycles. Excluding these groups leaves me with 204 groups for the analysis. One concern in this trimming exercise is that the subset of 204 groups is not representative of the larger pool of groups. Well run groups might have a different savings pattern than poorly managed groups. The good groups might also live longer and thus have a higher probability of entering my analysis. Because of this the results are valid only for groups that survive more than one year. In practice, groups are usually considered independent after one year of functioning, so the results can be thought of as valid for independent groups. In theory, groups elsewhere might be different than the groups I study here, so this study can be thought of as a case study of 204 groups.

Before I turn to the analysis of the real savings profile, it is worthwhile to consider some descriptive statistics of the groups. These are listed in Table 2. For example, members buy an average of 82 shares in a period of 40 weeks, or two shares per meeting. The groups have been trained partly by field officers paid for by the project

and village agents paid for by the groups themselves. One seeming abnormality is the number of loans outstanding, which is eight on the average and thus might seem low when average membership is 17. However, this is the average for all observations per group, usually four. The first of these observations is in the very beginning of the group's cycle, where there are no loans outstanding. At the same time, the last of the observations is typically close to share-out where everyone pays back their loans. In the beginning and the end of a cycle, people simply do not take out loans. That this is the case can be seen in three ways. First, the standard error of 'within groups' average is much higher than the between groups' ditto. So each group varies over time. Second, Table 3 lists the averages for each 100 days of group ages. Clearly it is low in the beginning and in the end of the group's life. On average, 9.1 members in each group are savers only. This corresponds to 53%.

Descriptive statistics

	Total number of groups*	Total number of observations*	Mean	Std. Dev. overall	Std. dev. between groups**	SD within groups**
Group size at start of cycle	204		17.6	2.95		
Group size at the last data collection	153		17.0	3.50		
Average savings per member at the last data collection in Malawi Kwacha	204		6342	3657		
Average profits per member at the last data collection in Malawi Kwacha	204		1801	1522		
Share of women in groups	204	781	72.7%	23.4%	22.36%	6.4%
Dropouts since start of cycle	153		1.08	1.84		
Number of outstanding loans per group	204	840	7.96	6.75	3.0	6.1

* The number is sometimes lower than 204/840 due to missing observations in the original data

** The standard deviation between groups is the standard deviation of the group averages from the overall average. A high value means a big difference from one group to another. The standard deviation within groups is the standard deviation of the individual group's four observations from the group's average. The two figures are only defined for measures that change over time.

Table 2

Group age	Average loans outstanding
1-100	6.33
101-200	12.22
201-300	7.34
301-400	4.16

Table 3

The median real interest rate is 63%

The key result is the real interest rate calculated using standard financial calculation where I find the median to be 63%. The financial calculation I use is generally acknowledged in microfinance as well as in the ordinary financial sector and is also explained in most textbooks on finance (Brown and Zima, 2011; EU Directive 2008/48/EC 1998; MFTransparency, 2011; Truth in Savings Act 1991). The method is explained in Annex 1. In practice, it takes into account the savings profile and the problems of the simple method mentioned in the examples with Group A and Group B above. Using this method, I calculate one effective interest rate per group using all four observations from each group. I assume that the rate of savings is linear between the dates on which the observations were made, but since there are four observations, the overall savings profile can be non-linear. If groups save more in the beginning and less at the end, this is taken into account. As such, this way of computing the interest rate imposes a minimum of assumptions on the savings profile given the available data. Of course, if the individual savings profiles differ from the group level average, the individual interest rates will be different.

Using this method, the median annual real interest rate in the 204 groups is 63%. In contrast, the simple method generates a median interest rate of 29%. The averages are 91% for the financial method and 36% for the simple method, but since there are a few high interest rates and many rates between zero and one, I consider the median to be a better descriptive measure in this case. Taking the financial method as a standard, the simple method is wrong by at least 18 percentage points in more than 75% of the cases. It is within plus minus 10 percentage points in only 8.3% of the cases. Figure 4 shows how the differences between the simple calculation and the financial calculation for the 204 groups are

distributed.[6] Figure 5 displays the density plots of the two distributions. It is clear that the simple calculation falls systematically below the financial calculation. This is a result of the fact that savings do not happen in the beginning of the cycle as the simple method assumes, but throughout the period. As such, the simple calculation underestimates the true interest rate. Further, the simple interest rate seems to be less variable than the standard financial calculation.

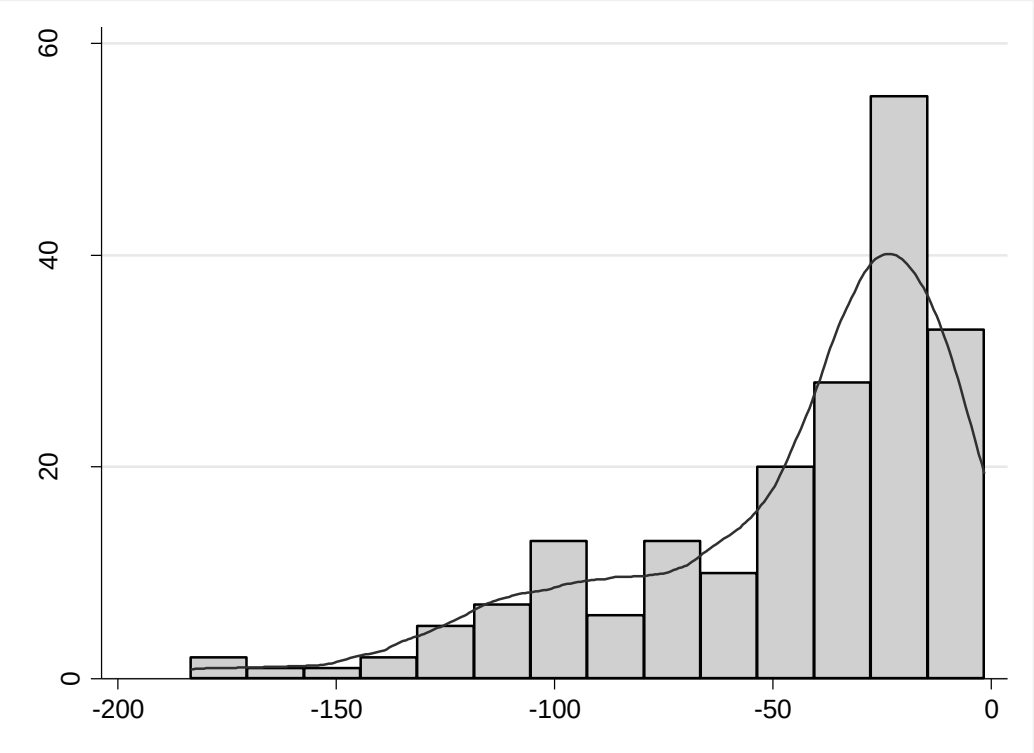

Figure 4. Difference between simple calculation and financial calculation (percentage points)

[6] In the Figure 4, 6, 7 and 10 I remove between one and 16 outliers for the purpose of display. These are, however, included in the calculations.Figure 6

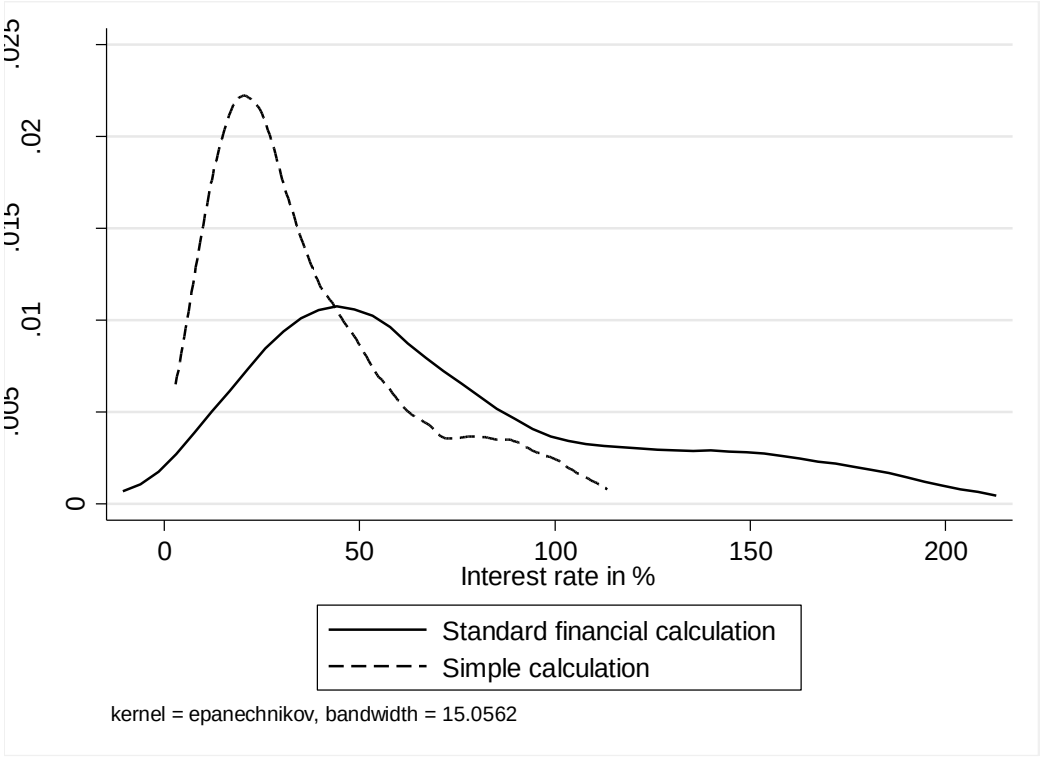

Figure 5.

I conclude that the approximation used by the simple method misses the mark.

How should we report interest rates on savings in savings groups?

The standard financial calculation requires some calculations that might seem difficult to some. Computing the interest rate is complicated by the fact that the current tool used to monitor savings groups is an excel sheet that makes calculations based only on the most recent observations from the groups. To complete the calculation, information from all time points is needed. To move forward, two options seem feasible: the next generation of the standard management information system is currently being developed and will be online. As such, the data from multiple observations per group will be available and using standard financial calculation will be possible. Alternatively, one can assume general linear savings and then compute the interest rate from one observation using the age of the group and the profits. In this case, the calculation can be done once and displayed in a table. This table can

then be used for look-up of the real effective interest rate. Such a table is presented in Annex 2 for annual savings and Annex 3 for monthly savings. The latter is included since the interest rate will inevitably change during the cycle, and an annual rate might give the false impression that it is a projection. Below I use numbers from the table with annual interest rates. The tables work like this: using data from the group, one can look up the group's simple returns on savings and its age within the current cycle. The corresponding cell then gives you the real effective annualised interest rate resulting from standard financial calculations. Compared to the standard financial calculation, the table is imprecise in two ways. Most importantly, it ignores the fact that some groups save more in the beginning of the cycle, while others save more in the end. This makes the effective interest rate change. Moreover, the table must necessarily include discrete steps, in this case of 2.5 percentage points and four week periods.

To investigate the feasibility of the table look-up, I looked up the interest rate of all 204 groups and compared them with the financial calculation. In general terms, the look-up is a much better approximation than the simple calculation. Where the simple calculation falls far below the financial calculation, the look-up gives interest rates both below and above the financial calculation. As such, the median interest rate obtained by the table is 58%, compared to 63% using standard financial calculation. The average is 86% compared to 92%. The difference between the look-up measure and the standard financial calculation falls around zero (Figure 6). In contrast, the difference between the simple and the financial calculation is systematically below zero (Figure 4). In fact, the error is 0.86 percentage points on the average, and the median of the error is -0.6 percentage points.[7] 50% of the errors fall between

[7] A standard 95% confidence interval of the difference is -10.34 to 0.42 percentage points.

1.1 and 3.7 percentage points. The density plots of all three calculations are shown in Figure 7.

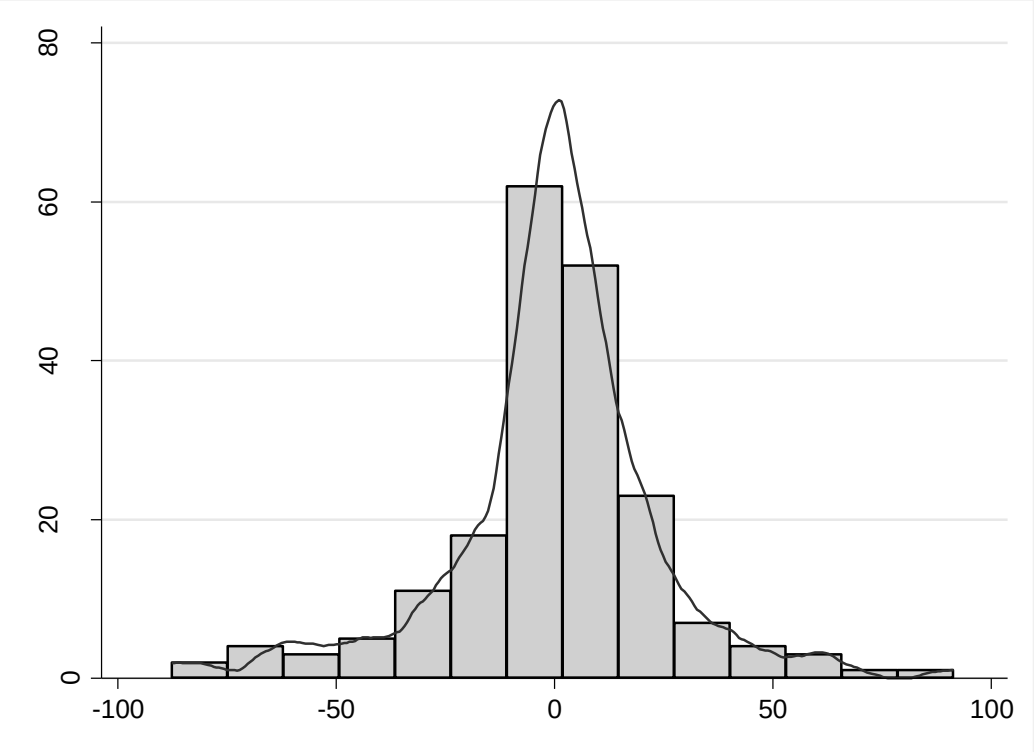

Figure 6. Difference between interest from table and financial calculation (percentage points)

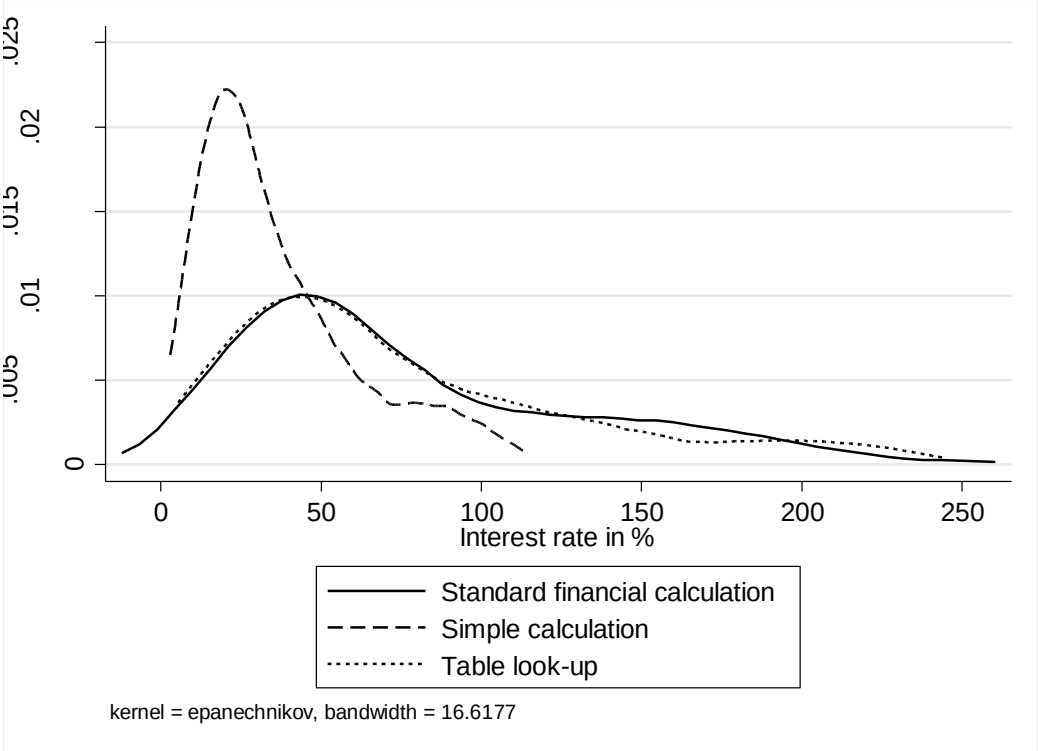

Figure 7.

The reason for the match between the look-up table and the financial calculation is that the savings profile is linear on the average. To compare savings profiles, I have normalised both age and savings so that both are between zero and 100. This enables graphing of the savings profile. Five examples are given in Figure 8 and all 200 groups are graphed in Figure 9. This gives a graphical illustration of comparison of medians above: the fact that linear or constant savings is a good average approximation.

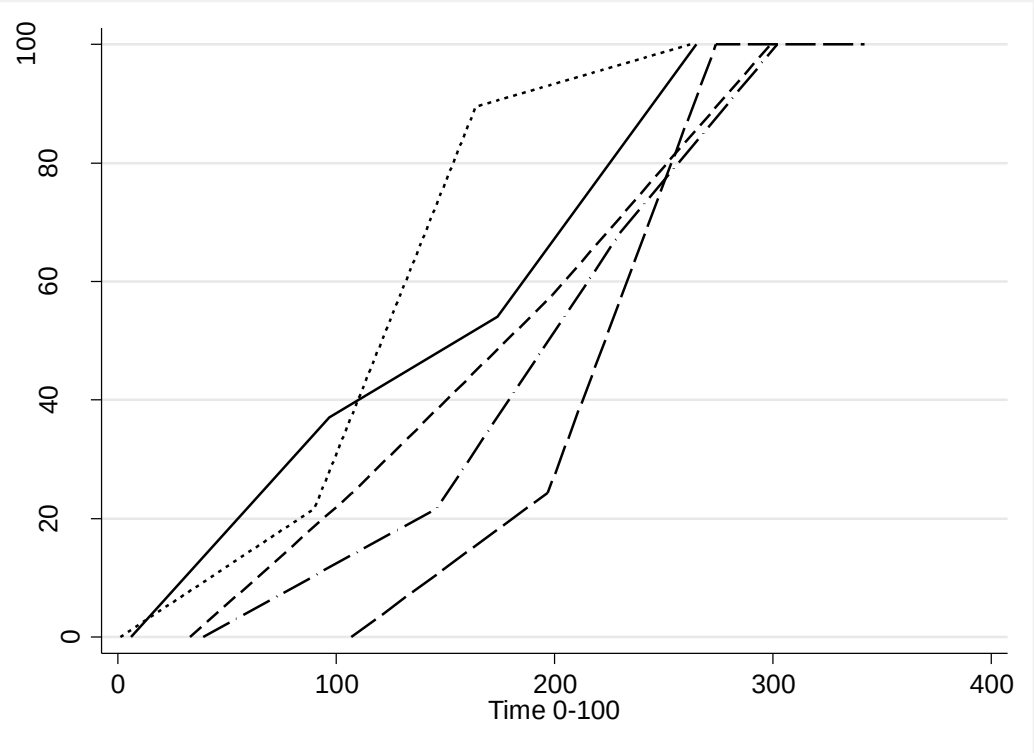

Figure 8

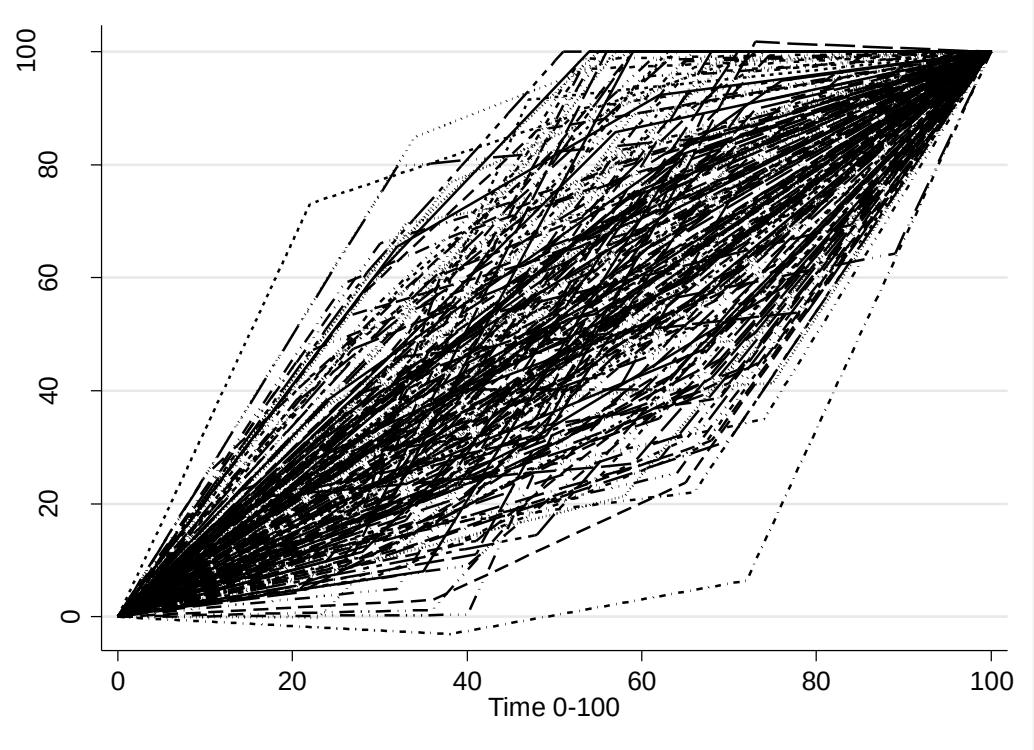

Figure 9

Where did all the money go?

Even with the adjustment to the interest rate on savings obtained by the financial calculation above, there is still an important unexplained fact. The annualised interest rate on loans is 245%, but the annualised interest rate on savings is 63%. Where does this large difference come from? An obvious explanation is incomplete fund usage, which I analyse in the next section.

Incomplete fund usage

When members save in their groups, not all savings are lent out at any one time. Naturally, the funds not lent out do not accumulate interest even though they are saved. The ratio between all funds and lent out funds is known as the loan fund use ratio. So the expected interest rate is not 245%, but lower. How much lower? If I know the interest rate, *r*, and the loan fund use ratio, *L*, then the expected interest rate when corrected for loan use is

$$r_{LU} = L * r \tag{5}$$

The groups in my dataset have an average loan fund use ratio of 46%. The interest rate on loans is set to 10% or 20% with a few groups higher or lower. The average is 14.9% or 511% annually. Adjusted for loan fund use this equals 230%. But the 46% is a simple average across all observations and all groups. It matters how the loan fund use ratio develops over time and it also matters that different groups set the nominal interest rate differently. The change in loan fund use is shown in Figure 10. The solid line shows the local average of loan fund use. Clearly, it is low in the beginning and the end. To calculate the missing funds more precisely, I compute a "potential interest rate" for each group. This interest rate is the return on savings the groups would have made if their stated nominal interest rates and loan fund uses are correct.[8] Using this information, the average interest rate is 137%, which is considerably lower than the 230% from above. Nevertheless, the calculation does not change the basic finding that some funds are missing, since there is still a gap of 74 percentage points between 63% and 137%. In fact, the difference between the effective interest rate and the potential interest rate, which I call *the missing interest rate*, is an excellent metric to track performance of the groups since is measures missing money in the groups. The distribution of difference for all groups is shown in Figure 11. Any project manager should visit the groups with a missing interest rate of more than, say, 20 percentage points. In the present dataset this means that 125 groups should be checked.

The global data looks better. Here I have only the simply average loan fund use, which is 52.2%. Assuming a ten percent nominal interest rate per four-week period the

[8] To arrive at this figure, I compute loan fund use at each loan meeting by assuming that loan fund use develops linearly between the observation points. Using total savings, I compute how potential assets would accumulate. Using the same method as described in Annex 1, I then replace the final payout in the sequence of payments with this potential assets and re-compute the effective interest rate. This figure is the potential interest rate.

corresponding annual interest rate is 110%, but taking changing loan fund use into account might reduce this. Moreover, the reported interest rate on savings of 35% might be twice as high. Due to the lack of information it is not possible to confirm that the missing interest rate is lower than in my sample, but on the other hand it cannot be ruled out.

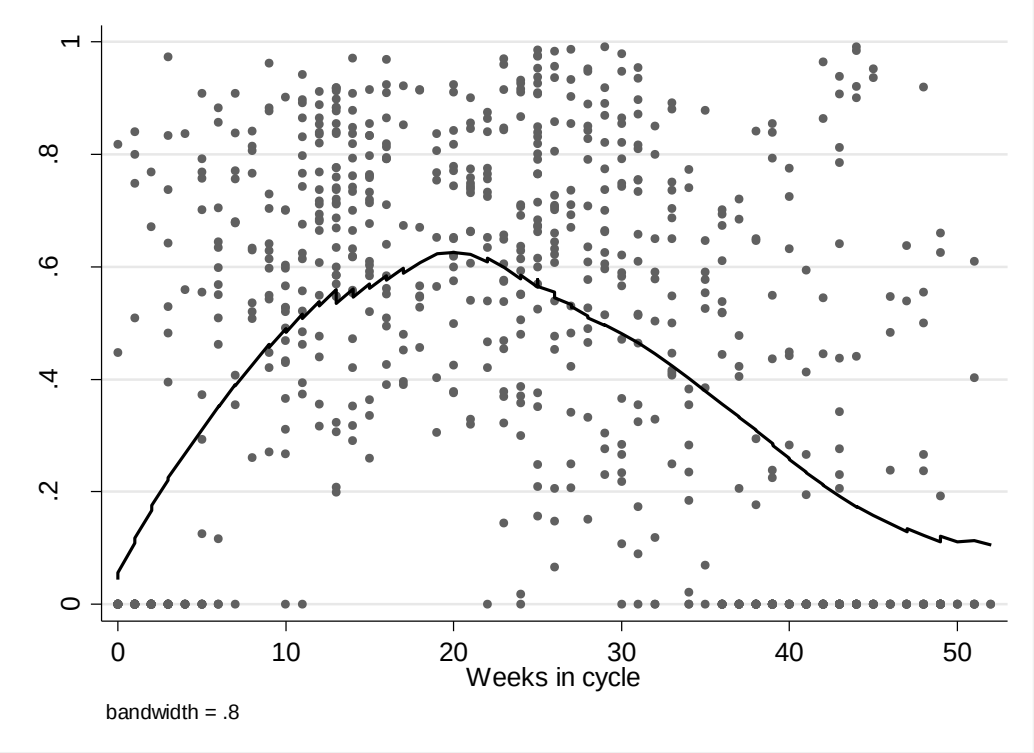

Figure 10. Loan fund use over time (lowess plot)

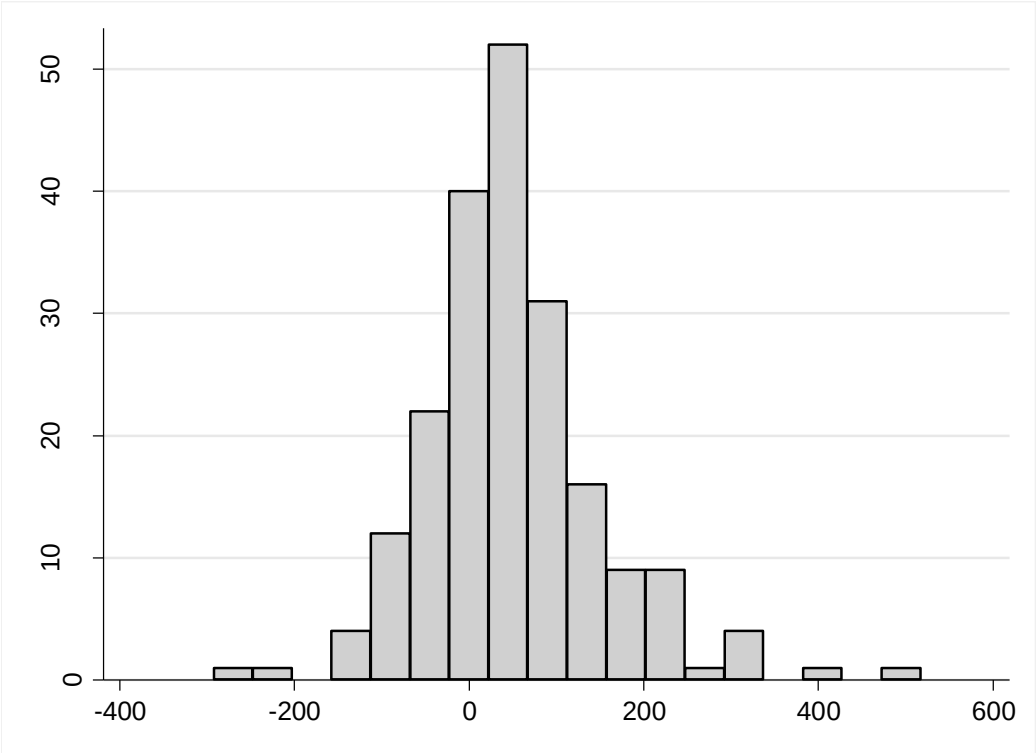

Figure 11. Difference between effective interest rate and potential interest rate (percentage points)

Explaining this gap is not the purpose of the present paper and is likely to require more detailed information, e.g. from the passbooks used by many savings groups, but four possibilities seem particularly likely: first, there might be a large share of non-performing loans in the groups. Write-off of these loans is supposed to be reported, but for the 204 groups in my analysis, only one reported any write-off at all. It is possible that the groups have not yet given up on the loans, but that they have not been paid back. Second, groups might have very relaxed repayment schedules without charging additional interest. This would lower the interest rate accordingly. Third, the surplus might simply have been stolen. Finally, there might be issues of data quality. Which of these explanations is the correct one is an area for future research and will require new data, for example by using data from passbooks.

Conclusions

It is clear from the above treatment of interest rates in savings groups that savings groups offer net savers very high interest rates. Looking at more than 200 groups in Malawi, I find a

median interest rate of 63%, and a mean of 91%. The officially reported figure had a median of 29% and a mean of 36%. If net savers are among the poorest, this is very good news: for once, the most world's most marginalised and poor people get the world's best deals.

Whereas these Malawian groups might not be representative of all the world's savings groups, the results do underline the fact that interest rates in savings groups are probably high in Malawi and elsewhere. Returns to capital in rural Africa are substantial. Furthermore, the official figures underestimate the interest rate by a great deal, in my case at least a factor two. Whether the figure should be multiplied by 1.5 or 3.5 will probably depend on local characteristics, but this uncertainty does not change the fact that the calculation currently in use is different from the true interest rate and neither internally nor externally consistent.

Acknowledging that current computing power in savings group implementation is probably limited, I offer an alternative approach to calculating all interest rates: a look-up table with translations from the simple interest rate in current use to the financial calculation. This method is considerably closer to the financial calculation, although there are still differences. On the basis of this interest rate, I suggest a metric for monitoring group performance, the missing interest rate, which compares the interest rate on loans with the interest rate on savings.

In practice, these results will matter to policy-makers, donors and practitioners in aid. First, practitioners should acknowledge that interest rates computed using standard financial calculation is the proper way to summarise the price or yield of money in time. As such they should adjust all calculations to match the standard financial metrics or at least pick a metric that is close, e.g. in the look-up table in Annex 2. Adapting standard financial calculation will enable practitioners to assess group performance by comparing interest on loans with interest on savings to obtain the "missing interest". To improve monitoring, practitioners should

collect information on two central payments, which are not in the monitoring systems today: the share-out at the end of a cycle and any initial payment by members at the start of the cycle. The former is required for analysis of interest rates beyond a single cycle. The latter is required for any analysis of groups older than one cycle. Second, donors should sustain their funding for savings groups. Returns of 60% should not be ignored. If the up-coming impact studies of savings groups show no effect, donors should fund studies with longer durations and more statistical power using the knowledge on how groups work gained in the first impact assessments. A high-yielding savings product needs serious assessment. Third, policy makers should make sure to create an enabling environment for savings groups, but should also acknowledge the groups as small financial institutions. Financial regulation should make sure to take their special characteristics into account, but financial literacy is just as important here as in other financial services. Fourth, all persons and institutions involved should have an interest in finding out where the missing funds go and finally, academics should start to analyze the factors behind the effective interest rate.

After having been hidden for a long time, savings groups have started to appear on the radar of policy makers and academics. This is good news for everyone working with or saving in a savings group. But it will necessarily lead to comparison of savings groups and other financial instruments and will thus require practitioners to report key metrics like interest rates in ways comparable to other financial products in the financial landscape. Only by doing that will savings groups appear on the radar as a viable alternative or cost effective supplement to formal financial access.

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Annex 1

How is standard financial calculation different?

The financial calculation used computes effective interest using net present value, which is the sum of all payments discounted to the present. The effective interest rate is the interest rate where the net present value is zero. This method is used in financial textbooks as well as mandated by financial legislators around the world. Further, it is recommended by Microfinance Transparency, an organisation working for transparent interest rates. Annualisation is done using standard compounded interest.

For VSLAs, it makes sense to use weeks as the smallest period. Then the formula is:

$$NPV = \sum_{n=0}^{N} \frac{C_n}{(1+r)^n} = 0$$

where *NPV* is net present value, *N* is the total number of weeks and C_n is the payment in period *n*. For savings, this is a negative number. In period *N*, i.e. the period when the group is observed, this is a positive figure indicating how much the group could share out today if it were to hold a share-out. The weekly interest is *r*. I find *r* by calculating a sequence of payments for each group, assuming that the sequence is linear between the individual observations and between the group start and the first observation. Since all groups are in their first cycle, they must have started with zero savings.

Calculation example

I use the values for assets and total savings. Assets are all savings and net accumulated earnings in the group. In the second and subsequent cycles, it is common for groups to contribute a large amount at the first savings meeting, in which case the calculations below would not be valid. In my calculations, I have disregarded groups in their second cycle (this only concerned two groups). I calculate the savings per period and the average savings per week. The latter might vary over the total period. One unexplained fact for the group in the example below is the difference between assets and total savings in week one. I interpret this as a gift and thus do not count it as initial savings. The payout is total assets in the last period. Table 4 shows numbers from one group as an example.

Weeks in cycle	Assets	Debt	Total savings	Savings difference	Week difference	Savings difference per week	Payout
1	16750		13000	13000			
14	104700		89600	76600	13	5892	
25	145000		124600	35000	11	3182	
38	278150		219500	94900	13	7300	278150

Table 4

Simple calculation

$$\text{Interest rate (37 weeks)} = \frac{\text{Assets - Total savings}}{\text{Total savings}} = \frac{58650}{219500} = 26.7\%$$

$$\text{Interest rate (annualized)} = 26.7\% * \frac{52}{38} = 36.6\%$$

Financial calculation

From the above values, I make the sequence of payments as displayed in Table 5. I then calculate the weekly interest rate using the NPV-formula above. This can be done in Excel using the functions "internal rate of return" or "goal seek". In my case, I use the statistical software Stata. All methods give same results.

$$\text{Interest rate (weekly)} = 0.01191$$

$$\text{Interest rate (37 weeks)} = (1+0.011191)^{37} - 1 = 55.0\%$$

$$\text{Interest rate (annualized)} = (1+0.01191\%)^{52} - 1 = 85.1\%$$

Period	Payment sequence	Period	Payment sequence	Period	Payment sequence
0	-13000	13	-5892	26	-7300
1	-5892	14	-3182	27	-7300
2	-5892	15	-3182	28	-7300
3	-5892	16	-3182	29	-7300
4	-5892	17	-3182	30	-7300
5	-5892	18	-3182	31	-7300
6	-5892	19	-3182	32	-7300
7	-5892	20	-3182	33	-7300
8	-5892	21	-3182	34	-7300
9	-5892	22	-3182	35	-7300
10	-5892	23	-3182	36	-7300
11	-5892	24	-3182	37	-7300
12	-5892	25	-7300	38	278150

Table 5

Annex 2. Determining the annual interest rate using the simple return on savings and the age of the group

Simple return on savings	Age of group this cycle												
	52	**48**	**44**	**40**	**36**	**32**	**28**	**24**	**20**	**16**	**12**	**8**	**4**
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2.5%	4.9%	5.4%	5.8%	6.4%	7.2%	8.1%	9.2%	10.8%	12.9%	16.2%	21.7%	32.9%	66.9%
5.0%	10.0%	10.8%	11.8%	13.1%	14.6%	16.5%	19.0%	22.3%	27.1%	34.5%	47.3%	75.1%	174.5%
7.5%	15.1%	16.4%	18.0%	19.9%	22.2%	25.3%	29.2%	34.6%	42.5%	54.9%	77.3%	128.8%	345.1%
10.0%	20.2%	22.0%	24.2%	26.9%	30.2%	34.4%	40.0%	47.8%	59.2%	77.7%	112.1%	196.7%	612.3%
12.5%	25.5%	27.8%	30.6%	34.1%	38.4%	44.0%	51.4%	61.8%	77.4%	103.0%	152.6%	282.0%	1025.7%
15.0%	30.8%	33.7%	37.2%	41.5%	46.9%	53.9%	63.3%	76.7%	96.9%	131.1%	199.3%	388.4%	1657.9%
17.5%	36.1%	39.6%	43.8%	49.0%	55.6%	64.2%	75.8%	92.5%	118.1%	162.1%	253.0%	520.5%	2614.0%
20.0%	41.6%	45.7%	50.6%	56.8%	64.6%	74.8%	88.9%	109.2%	140.8%	196.4%	314.6%	683.3%	4045.1%
22.5%	47.1%	51.8%	57.5%	64.7%	73.8%	85.9%	102.5%	126.8%	165.2%	234.0%	384.9%	883.0%	6165.6%
25.0%	52.6%	58.0%	64.6%	72.8%	83.3%	97.4%	116.8%	145.5%	191.4%	275.2%	464.8%	1126.7%	9277.9%
27.5%	58.3%	64.3%	71.8%	81.1%	93.1%	109.2%	131.7%	165.1%	219.4%	320.3%	555.5%	1422.5%	13804.5%
30.0%	64.0%	70.7%	79.1%	89.6%	103.2%	121.4%	147.2%	185.8%	249.4%	369.6%	658.0%	1780.1%	20331.0%
32.5%	69.7%	77.2%	86.5%	98.2%	113.5%	134.1%	163.3%	207.6%	281.3%	423.2%	773.6%	2210.2%	29662.8%
35.0%	75.5%	83.8%	94.0%	107.0%	124.0%	147.1%	180.0%	230.4%	315.3%	481.5%	903.4%	2725.3%	42899.6%
37.5%	81.4%	90.5%	101.7%	116.0%	134.8%	160.5%	197.4%	254.3%	351.4%	544.8%	1048.9%	3339.9%	61532.7%
40.0%	87.3%	97.2%	109.5%	125.2%	145.9%	174.4%	215.5%	279.4%	389.7%	613.3%	1211.6%	4070.0%	87570.0%
42.5%	93.3%	104.0%	117.4%	134.6%	157.3%	188.6%	234.2%	305.7%	430.4%	687.3%	1393.0%	4934.3%	123698.7%
45.0%	99.3%	110.9%	125.4%	144.1%	168.9%	203.2%	253.6%	333.1%	473.4%	767.1%	1594.8%	5953.6%	173491.6%
47.5%	105.4%	117.9%	133.6%	153.8%	180.7%	218.3%	273.6%	361.8%	518.9%	853.1%	1818.7%	7151.5%	241671.8%
50.0%	111.6%	125.0%	141.8%	163.6%	192.8%	233.7%	294.3%	391.6%	567.0%	945.6%	2066.7%	8554.7%	334446.8%
52.5%	117.8%	132.1%	150.2%	173.6%	205.2%	249.6%	315.8%	422.8%	617.7%	1044.8%	2340.8%	10193.0%	459930.3%
55.0%	124.0%	139.3%	158.6%	183.8%	217.9%	265.9%	337.9%	455.2%	671.1%	1151.3%	2643.0%	12099.8%	628671.7%
57.5%	130.3%	146.6%	167.2%	194.2%	230.7%	282.6%	360.7%	489.0%	727.3%	1265.2%	2975.7%	14312.7%	854317.1%
60.0%	136.6%	153.9%	175.9%	204.7%	243.9%	299.7%	384.2%	524.1%	786.4%	1387.1%	3341.1%	16873.2%	1154431.4%
62.5%	143.0%	161.3%	184.7%	215.4%	257.3%	317.2%	408.5%	560.5%	848.5%	1517.2%	3741.8%	19828.0%	1551516.8%
65.0%	149.5%	168.8%	193.6%	226.3%	270.9%	335.1%	433.5%	598.4%	913.7%	1655.9%	4180.5%	23228.4%	2074271.5%
67.5%	155.9%	176.4%	202.6%	237.3%	284.9%	353.5%	459.2%	637.6%	982.0%	1803.6%	4659.9%	27131.7%	2759127.0%
70.0%	162.5%	184.1%	211.8%	248.5%	299.0%	372.2%	485.6%	678.3%	1053.6%	1960.8%	5182.9%	31601.1%	3652144.9%
72.5%	169.0%	191.8%	221.0%	259.8%	313.5%	391.4%	512.8%	720.4%	1128.4%	2127.9%	5752.6%	36706.4%	4811312.6%
75.0%	175.7%	199.5%	230.3%	271.3%	328.1%	411.1%	540.8%	764.0%	1206.8%	2305.2%	6372.2%	42524.4%	6309347.1%
77.5%	182.3%	207.4%	239.7%	283.0%	343.1%	431.1%	569.5%	809.2%	1288.6%	2493.2%	7045.2%	49139.8%	8237085.5%

	80.0%	189.0%	215.3%	249.3%	294.8%	358.2%	451.6%	598.9%	855.8%	1374.0%	2692.3%	7775.0%	56645.6%	10707567.3%
	82.5%	195.8%	223.2%	258.9%	306.8%	373.7%	472.5%	629.2%	904.1%	1463.2%	2903.1%	8565.4%	65143.5%	13860963.2%
	85.0%	202.6%	231.3%	268.6%	318.9%	389.4%	493.8%	660.2%	953.8%	1556.1%	3125.8%	9420.2%	74745.1%	17870472.4%
	87.5%	209.4%	239.4%	278.5%	331.2%	405.3%	515.5%	692.0%	1005.2%	1652.9%	3361.2%	10343.6%	85572.2%	22949383.5%
	90.0%	216.3%	247.5%	288.4%	343.6%	421.5%	537.7%	724.6%	1058.2%	1753.7%	3609.5%	11339.8%	97758.0%	29359475.3%
	92.5%	223.2%	255.8%	298.4%	356.2%	437.9%	560.3%	758.0%	1112.9%	1858.5%	3871.3%	12413.1%	111447.2%	37421052.6%
	95.0%	230.1%	264.1%	308.5%	368.9%	454.6%	583.3%	792.2%	1169.2%	1967.5%	4147.1%	13568.3%	126797.7%	47524724.3%
	97.5%	237.1%	272.4%	318.8%	381.8%	471.6%	606.8%	827.1%	1227.3%	2080.8%	4437.4%	14810.1%	143981.0%	60145533.2%
	100.0%	244.1%	280.8%	329.1%	394.9%	488.7%	630.7%	862.9%	1287.0%	2198.4%	4742.8%	16143.5%	163182.9%	75859401.6%

Annex 3. Determining the monthly interest rate using the simple return on savings and the age of the group

Simple return on savings	Age of group this cycle												
	52	**48**	**44**	**40**	**36**	**32**	**28**	**24**	**20**	**16**	**12**	**8**	**4**
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2.5%	0.4%	0.4%	0.4%	0.5%	0.5%	0.6%	0.7%	0.8%	0.9%	1.2%	1.5%	2.2%	4.0%
5.0%	0.7%	0.8%	0.9%	0.9%	1.1%	1.2%	1.3%	1.6%	1.9%	2.3%	3.0%	4.4%	8.1%
7.5%	1.1%	1.2%	1.3%	1.4%	1.6%	1.7%	2.0%	2.3%	2.8%	3.4%	4.5%	6.6%	12.2%
10.0%	1.4%	1.5%	1.7%	1.8%	2.1%	2.3%	2.6%	3.1%	3.6%	4.5%	6.0%	8.7%	16.3%
12.5%	1.8%	1.9%	2.1%	2.3%	2.5%	2.8%	3.2%	3.8%	4.5%	5.6%	7.4%	10.9%	20.5%
15.0%	2.1%	2.3%	2.5%	2.7%	3.0%	3.4%	3.8%	4.5%	5.4%	6.7%	8.8%	13.0%	24.7%
17.5%	2.4%	2.6%	2.8%	3.1%	3.5%	3.9%	4.4%	5.2%	6.2%	7.7%	10.2%	15.1%	28.9%
20.0%	2.7%	2.9%	3.2%	3.5%	3.9%	4.4%	5.0%	5.8%	7.0%	8.7%	11.6%	17.2%	33.2%
22.5%	3.0%	3.3%	3.6%	3.9%	4.3%	4.9%	5.6%	6.5%	7.8%	9.7%	12.9%	19.2%	37.5%
25.0%	3.3%	3.6%	3.9%	4.3%	4.8%	5.4%	6.1%	7.2%	8.6%	10.7%	14.2%	21.3%	41.8%
27.5%	3.6%	3.9%	4.2%	4.7%	5.2%	5.8%	6.7%	7.8%	9.3%	11.7%	15.6%	23.3%	46.2%
30.0%	3.9%	4.2%	4.6%	5.0%	5.6%	6.3%	7.2%	8.4%	10.1%	12.6%	16.9%	25.3%	50.6%
32.5%	4.2%	4.5%	4.9%	5.4%	6.0%	6.8%	7.7%	9.0%	10.8%	13.6%	18.1%	27.3%	55.0%
35.0%	4.4%	4.8%	5.2%	5.8%	6.4%	7.2%	8.2%	9.6%	11.6%	14.5%	19.4%	29.3%	59.4%
37.5%	4.7%	5.1%	5.5%	6.1%	6.8%	7.6%	8.7%	10.2%	12.3%	15.4%	20.7%	31.3%	63.9%
40.0%	4.9%	5.4%	5.9%	6.4%	7.2%	8.1%	9.2%	10.8%	13.0%	16.3%	21.9%	33.2%	68.4%
42.5%	5.2%	5.6%	6.2%	6.8%	7.5%	8.5%	9.7%	11.4%	13.7%	17.2%	23.1%	35.2%	72.9%
45.0%	5.4%	5.9%	6.5%	7.1%	7.9%	8.9%	10.2%	11.9%	14.4%	18.1%	24.3%	37.1%	77.5%
47.5%	5.7%	6.2%	6.7%	7.4%	8.3%	9.3%	10.7%	12.5%	15.1%	18.9%	25.5%	39.0%	82.1%
50.0%	5.9%	6.4%	7.0%	7.7%	8.6%	9.7%	11.1%	13.0%	15.7%	19.8%	26.7%	40.9%	86.7%
52.5%	6.2%	6.7%	7.3%	8.1%	9.0%	10.1%	11.6%	13.6%	16.4%	20.6%	27.9%	42.8%	91.3%
55.0%	6.4%	6.9%	7.6%	8.4%	9.3%	10.5%	12.0%	14.1%	17.0%	21.5%	29.0%	44.7%	96.0%
57.5%	6.6%	7.2%	7.9%	8.7%	9.6%	10.9%	12.5%	14.6%	17.6%	22.3%	30.2%	46.6%	100.6%
60.0%	6.9%	7.4%	8.1%	8.9%	10.0%	11.2%	12.9%	15.1%	18.3%	23.1%	31.3%	48.4%	105.3%
62.5%	7.1%	7.7%	8.4%	9.2%	10.3%	11.6%	13.3%	15.6%	18.9%	23.9%	32.4%	50.3%	110.1%
65.0%	7.3%	7.9%	8.6%	9.5%	10.6%	12.0%	13.7%	16.1%	19.5%	24.7%	33.5%	52.1%	114.8%
67.5%	7.5%	8.1%	8.9%	9.8%	10.9%	12.3%	14.2%	16.6%	20.1%	25.4%	34.6%	53.9%	119.6%

	70.0%	7.7%	8.4%	9.1%	10.1%	11.2%	12.7%	14.6%	17.1%	20.7%	26.2%	35.7%	55.7%	124.4%
	72.5%	7.9%	8.6%	9.4%	10.4%	11.5%	13.0%	15.0%	17.6%	21.3%	27.0%	36.8%	57.5%	129.2%
	75.0%	8.1%	8.8%	9.6%	10.6%	11.8%	13.4%	15.4%	18.0%	21.9%	27.7%	37.8%	59.3%	134.0%
	77.5%	8.3%	9.0%	9.9%	10.9%	12.1%	13.7%	15.7%	18.5%	22.4%	28.5%	38.9%	61.1%	138.9%
	80.0%	8.5%	9.2%	10.1%	11.1%	12.4%	14.0%	16.1%	19.0%	23.0%	29.2%	39.9%	62.9%	143.7%
	82.5%	8.7%	9.4%	10.3%	11.4%	12.7%	14.4%	16.5%	19.4%	23.6%	29.9%	40.9%	64.6%	148.6%
	85.0%	8.9%	9.7%	10.6%	11.6%	13.0%	14.7%	16.9%	19.9%	24.1%	30.6%	42.0%	66.4%	153.5%
	87.5%	9.1%	9.9%	10.8%	11.9%	13.3%	15.0%	17.3%	20.3%	24.6%	31.3%	43.0%	68.1%	158.4%
	90.0%	9.3%	10.1%	11.0%	12.1%	13.5%	15.3%	17.6%	20.7%	25.2%	32.0%	44.0%	69.8%	163.4%
	92.5%	9.4%	10.3%	11.2%	12.4%	13.8%	15.6%	18.0%	21.2%	25.7%	32.7%	45.0%	71.6%	168.3%
	95.0%	9.6%	10.5%	11.4%	12.6%	14.1%	15.9%	18.3%	21.6%	26.2%	33.4%	46.0%	73.3%	173.3%
	97.5%	9.8%	10.6%	11.6%	12.9%	14.3%	16.2%	18.7%	22.0%	26.8%	34.1%	47.0%	75.0%	178.3%
	100.0%	10.0%	10.8%	11.9%	13.1%	14.6%	16.5%	19.0%	22.4%	27.3%	34.8%	47.9%	76.7%	183.3%