

CARE

**Promoting Opportunities for Women's
Economic Empowerment Project**

Analysis of Effects of Linkage



Table of Contents

Executive Summary	3
Methods	5
Results	9
Part 1: Return on Savings	9
Part 2: Return on Assets	22
Part 3: Savings Per Member	33
Part 4: Dormancy Rates	37
Part 5: Access to Credit	38
Part 6: Individual Accounts	40
Part 7: Bank Balances	42
Part 8: Percent of Total Savings in Bank	45
Part 9: Financial Literacy Training	46
Conclusion	47

Executive Summary

This report focuses on the effects of CARE's POWER/PROFIR (Promoting Opportunities for Women's Economic Empowerment) project on the financial health of village savings and loans groups in Cote d'Ivoire and Rwanda. The project is a collaboration between CARE Canada, Access Africa, and MasterCard Foundation. CARE International is one of the world's leading organizations in the promotion of Village Savings and Loan Associations (VSLAs) in Africa, reaching more than 3.5 million people in 26 countries.

CARE's POWER project aims to determine the relative benefit of formal financial links for savings groups, households and individuals, and banks in Burundi, Ethiopia, Cote d'Ivoire, and Rwanda. However, this report only focuses on the two latter countries. For Rwanda, CARE's POWER project is called PROFIR (Promoting Financial Inclusion in Rwanda).

POWER/PROFIR is based on the VSLA approach as a means to provide access to valuable financial services and build a pathway towards formal financial inclusion for poor households in rural area. VSLA builds the financial skills and assets of participating households by providing access to a safe, convenient place to save and small timely loans. VSLA also provides the necessary opportunities and knowledge for members to use formal financial service providers.

The key outcomes in this report are (1) Standardized return on savings (ROS), (2) Standardized return on assets (ROA), (3) Savings per member, and (4) Adoption of individual bank accounts. These indicators measure progress towards POWER/PROFIR's objectives of building financial capacity for all clients and decreasing gender gaps in access to and control of financial skills, assets, and services. We also look at how group characteristics like the proportion of women members, attendance, access to credit, and financial literacy interact with linkage status to affect group's outcomes.

Information on these outcomes comes from partner service providers' administrative data for groups both linked and unlinked to formal financial service providers. We use propensity score matching to match linked groups with similar unlinked groups to better isolate the effect of linkage.

We find that returns on savings, return on assets, and savings per member has steadily increased over the duration of the project for linked and unlinked group in both countries. Furthermore, groups with more than 70% women and an attendance rate above 85% tend to outperform groups who fall short of these thresholds. Access to credit does not substantially affect performance.

Linked groups are achieving higher returns than unlinked groups and these returns are increasing at a faster pace. By 2017, a typical linked group In Rwanda had a return on savings that is \$22.35 USD more per member than a typical unlinked group. In Cote d'Ivoire, the difference In the ROS between linked and unlinked is \$11.50. When looking at how results vary

based on the proportion of women a group has, we see that groups with above 85% women far outperform groups with less women regardless of linkage status.

The returns on assets has grown faster between 2014 and 2017 for linked groups than unlinked groups. For linked groups, the ROA grew by 100% in Rwanda and 87% in Cote d'Ivoire. For unlinked groups, the ROA grew by 82% in Rwanda and 70% in Cote d'Ivoire. Groups with above 85% attendance also tend to have significantly higher returns than groups with lower attendance.

Overall, Cote d'Ivoire's 2% growth in savings per member between 2014 and 2017 severely lags behind Rwanda's 190% growth. However, linked groups in both countries outperform their unlinked counterparts. In Rwanda, the average linked group member saved \$10.32 more than the average unlinked group member. In Cote d'Ivoire, linked groups members saved \$11.79 more than unlinked group members.

We also examine how members of linked groups adopt and use individual bank accounts. By 2017, 42% of linked group members in Rwanda and 19% of linked group members in Cote d'Ivoire had a bank account. The majority of these individual accounts were opened by female members in both countries. Furthermore, the average linked group is keeping approximately one-third to one-half of their assets in their bank accounts.

The comparison of linked groups who have and have not received financial training shows that financial training leads to more active use of bank accounts as well as higher levels of bank balances being maintained.

Everything considered, groups linked to the formal financial sector are outperforming groups without a link. Moreover, members' individual use of bank accounts is growing year by year, especially among women. This shows progress towards the goal of financial inclusion. However, linkage is not the only ingredient to a successful group – this report shows that participation of women, regular attendance at group meetings, and financial literacy are also key.

Introduction

The POWER project - Promoting Opportunities for Women's Economic Empowerment – is a multi-country financial inclusions project designed to promote opportunities for women's economic empowerment in rural Africa. The project is a collaboration between CARE Canada, Access Africa, and MasterCard Foundation.

Three of the countries in the four-country project – Rwanda, Cote d'Ivoire, and Burundi are currently including linkage of VSLAs to formal financial institutions in their project activities. The country teams in Rwanda and Cote d'Ivoire are partnered with formal financial institutions, mobile network operators and SACCOs. Groups from Rwanda are linked with formal financial institutions including Vision Fund Rwanda, Umutanguha Finance, Wisigara Finance, Inkunga Finance, and Urwego Bank, Duterimbere and PAMF. The Cote d'Ivoire project is partnered with MTN, a mobile network operator for money transfer, PAMF (Aga Khan Foundation microfinance), and ADVANS, a formal financial institution. The Burundi linkages began later than the first two countries and is not included in this assessment.

This report addresses the quantitative analysis of questions around linkage and its impacts on savings groups. The analysis is based on a combination of different data sources, primarily the quarterly MIS data collected between 2014 and 2017 and data provided by the financial service providers within the same time period.

Methods

Data

This analysis is based on two primary datasets – the Group Standardized Management Information System dataset (MIS) and account data supplied by the partner financial service providers. The report is based on MIS data from 3729 groups in Rwanda and 2394 groups in Cote d'Ivoire. The financial service provider data includes 1525 groups in Rwanda and 156 groups in Cote d'Ivoire.

Group MIS data (Standardized Management Information System). This data is at the group level and is a standard series of 24 items. These include primarily economic indicators including total amount of savings, total amount of loans, count of loans, and a few administrative indicators such as count of members, percentage of group members who are women. This data is collected across all CARE savings groups as well as across savings groups from many other organizations. MIS data is collected from both groups which are linked with banks and those that are not. This large, standardized, and diverse database allows many types of analyses.

Financial provider data. This data is supplied to CARE as part of the bank partnership. The data provides the account balance of each group's account as well information on the group's history of savings and credit with the financial services provider.

Statistical Models

The data being generated within the POWER/Profit project is observational data – which means that it has been collected naturally from the groups and formal financial services rather than developed as part of a randomized trial. In order to understand the true effects of the project using this type of data, specific statistical methods need to be used. We are using two methods in combination: Matching and reweighting of data.

Since the MIS database contains information about groups, their linkage status, and their financial status, this data is a valuable source of non- experimental comparison groups. It allows us to track the trajectory of a large number of groups over time in order to establish a potentially causal trajectory.

We can also use the data to match unlinked groups with similar linked groups and weight the data in order to estimate the effect of linkages.

We are able to use propensity score matching with this data to help isolate and estimate the impact of linkages. Propensity score matching has several advantages in this particular research situation. Firstly, it greatly reduces the problems with dimensionality and the likelihood that inter-group characteristics are highly correlated. Secondly, the rate of economic growth of savings groups is not linear and propensity score matching helps us to avoid the assumptions of linearity in most traditional regression.

For this model, the variables that were used in the initial propensity score model were:

- Age of group
- Gender composition of group
- Type of trainer for group
- Cash at start
- Group distance to bank
- Group distance to agent
- Number of outstanding loans
- Number of cycles

The variables used as indicators are plausible predictors of economic growth of savings groups. Because we want to induce balance on variables that are prognostic of savings group behavior, we included these variables in our initial propensity score model. An initial propensity score model was estimated using the 8 variables. To estimate the propensity score, a logistic regression model was used in which treatment status was regressed on the baseline characteristics listed above. We tested several different matching methods including nearest neighbor, optimal matching and subclassification matching. We settled on nearest neighbor

matching because it resulted in the lowest mean differences between groups. The baseline variables were statistically related to the log-odds of receipt of treatment in the initial specification of the propensity score model. The variables used as baseline indicators are plausible predictors of economic growth of savings groups.

We compared the means and prevalences of continuous and categorical baseline covariates between treatment groups in the matched sample. The standardized difference was used to quantify differences in means or prevalences between treatment groups. Furthermore, we compared balance between treatment groups in all pairwise interactions of continuous covariates. The variance of continuous variables was compared between treatment groups in the matched sample. Finally, cumulative density plots and quantile-quantile plots were used to compare the distribution of continuous baseline covariates between treatment groups.

Linked and unlinked groups were then matched on the propensity score. In the data available, there were more unlinked groups than there were linked groups. For technical reasons, when matching, a pool of controls that is at least as large as the number of treated units is ideal, so this is a good situation for the analysis. We weighted the entire dataset by the inverse probability of treatment weights derived from the propensity score.

Three outcome variables were then used in the models: Profit/Loss; Return on Savings; Return on Assets. The difference in these rates was estimated directly by estimating the differences between linked and unlinked groups in the propensity score matched sample. For the models we used linear mixed-effects models and semi-parametric spline models. Confidence intervals were constructed using the Agresti method for matched samples.

Description of core variables

Profit/Loss (Net Loans – Net Savings) – Measures whether groups are net borrowers or net savers.

Standardized Return on Savings ((Profit/Loss)/(Total Savings)) - Measures the yield the group is achieving on savings, adjusted for the age of the group and the seasonality of the data collection. Please see the Appendix A for details on these calculations.

Standardized Return on Assets ((Profit/Loss)/(Total Assets)) - Measures the income the group is recouping on assets, adjusted for the age of the group and the seasonality of the data collection. Please see the Appendix A for details on these calculations.

Percent Women. Groups are divided into five subsets. Groups with less than 60% women members, 61-75% women members, 76-90% women members, 91-99% women members and 100% women members.

Proximity to Bank. Groups are divided into four subsets along the dimension of proximity to a bank. The groups are less than 3km away, 3-5 km away, 6-10 km away, and 11+ km away.

Group Attendance. Groups are divided into cohorts based on average group attendance rates. The cohorts are groups with less than 75% average attendance rates, 76-85% attendance rates, and above 85% attendance rates.

Results

Part 1: Return on Savings

The metric Return on Savings (ROS) measures the yield the group is achieving on its savings. Generally, the return is generated by the interest from loans provided by the group. The calculation is a standardized version of the groups profits divided by their total savings during the cycle, which has been standardized based on the mix of groups by age.

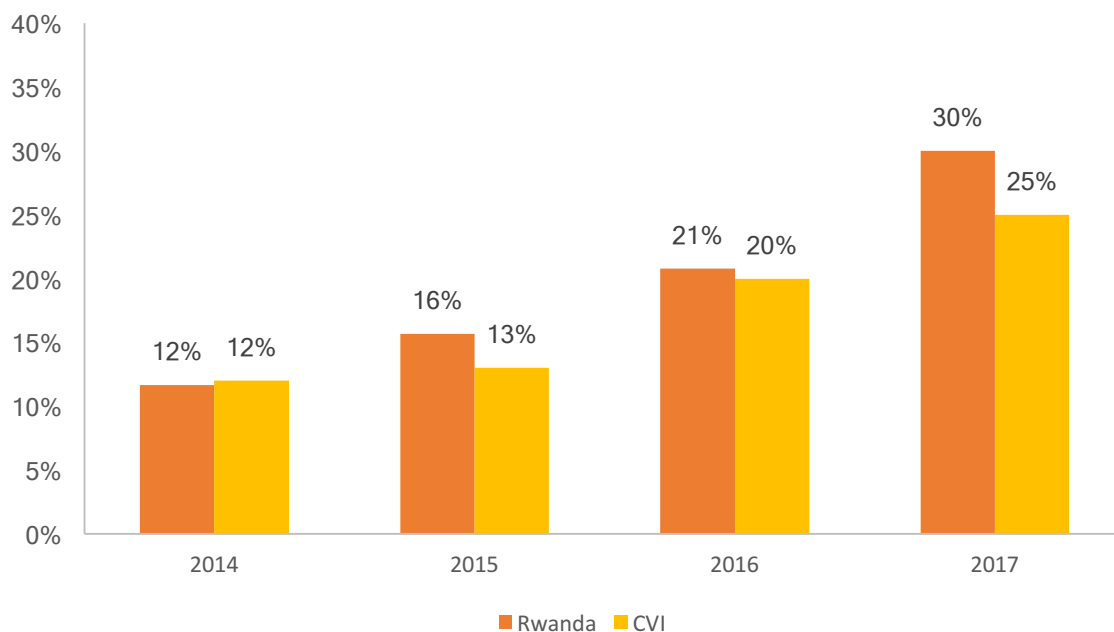
The calculations for return on savings is made using the MIS data from all the groups in the project, both linked and unlinked.

The ROS for savings groups in the Rwanda PROFIR project is currently 30% per cycle for typical groups – including both linked and unlinked groups. This is a significant increase over both the previous year – 21% in 2016 and over the original year 1 – 12% in 2014.

The savings group in Cote d'Ivoire have followed a very similar trajectory. Their current cyclical ROS is just slightly below, at 25% in 2017. This is also a significant improvement from 20% in 2016 and 12% in 2014. These results are for all groups in the projects – both linked and unlinked.

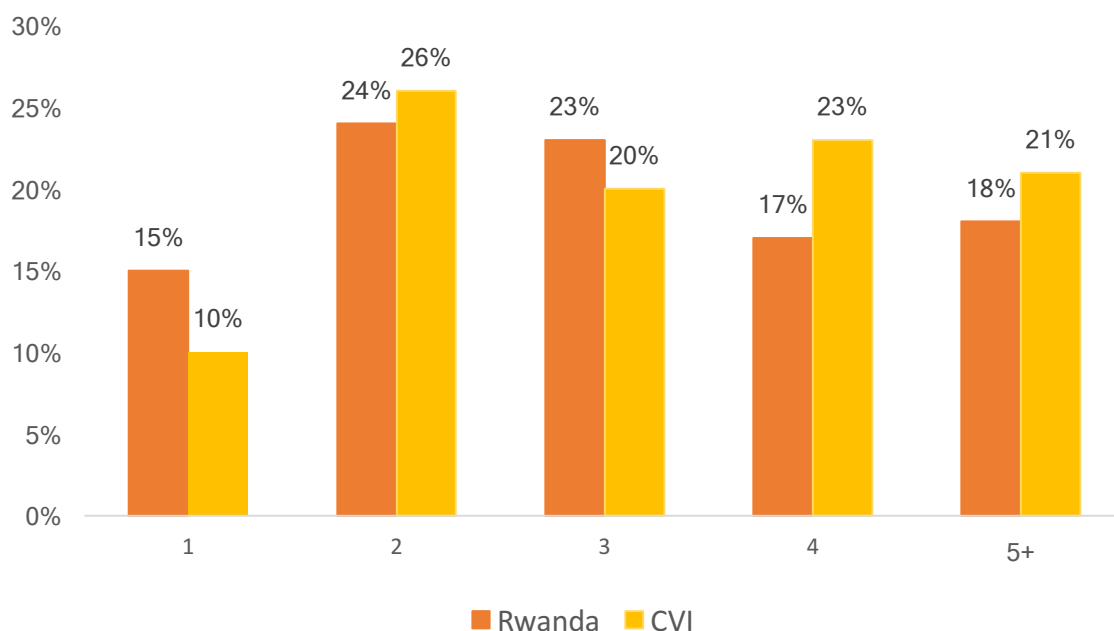
This consistent increase in the return on savings demonstrates successful maturation of the savings groups as part of the project.

Chart 1: Standardized return on savings for all groups – both linked and unlinked



When we look at the trends for all groups by group age, rather than by year, we can see a similar trend for both countries. The ROS is lowest at the first cycle, with returns at 15% for Rwanda and 10% for Cote d'Ivoire. Returns peak to nearly 25% for both countries at the second cycle, with moderate ups and downs as the cycles proceed.

Chart 2: Standardized return on savings for all groups by group age (measured in cycles)



Return on Savings by Linkage Status

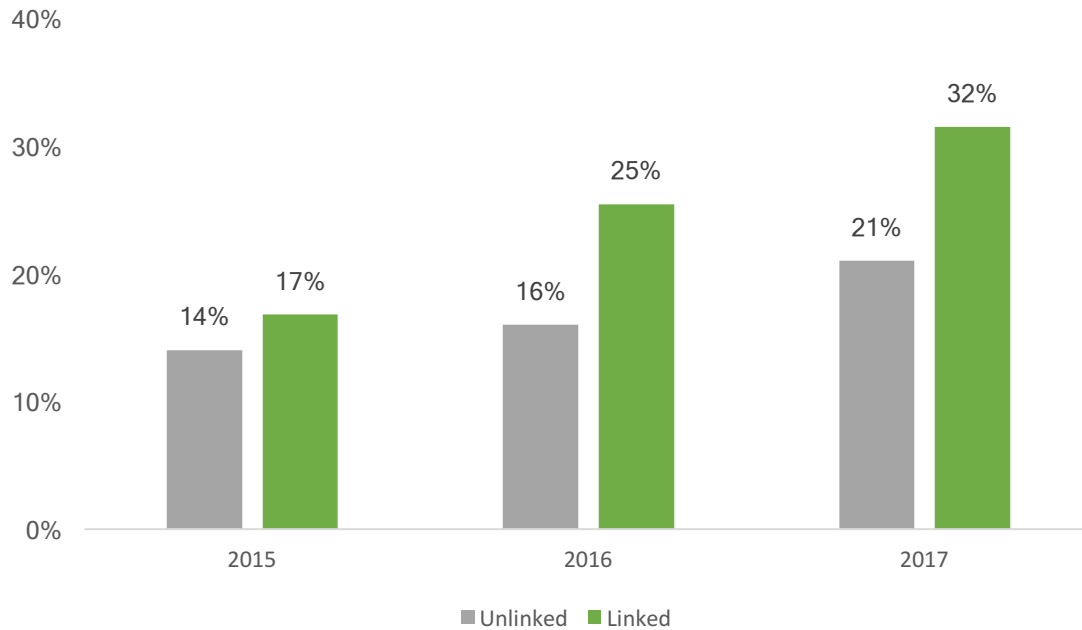
Overall in Rwanda, linked groups are earning a return on savings that is 57% higher than unlinked groups. This is based on the median ROS. If we compare average ROS instead of the median, the difference is a full 130%. But the averages are much less stable than the medians – meaning that the typical group is quite stable but there are some groups at the high and low ends of the distribution that fluctuate more – achieving very high returns some cycles and much lower returns in other cycles.

The linked groups are achieving higher returns than unlinked groups and these returns are increasing at a faster pace as well. In 2017, a typical linked group is earning approximately \$22.35 USD more per member than a typical unlinked group. The gap in median returns between linked and unlinked savings groups more than tripled from 3 percentage points in 2015 to 11 percentage points in 2017.

The median ROS also varies by the level of female participation in the group. In 2017, a typical group with a high proportion of women earns \$26.42 more than a comparable unlinked group. For groups with moderate proportions of women members, the difference is

\$17.81. Linked groups with low proportions of women earn about \$9.25 more than comparable unlinked groups.

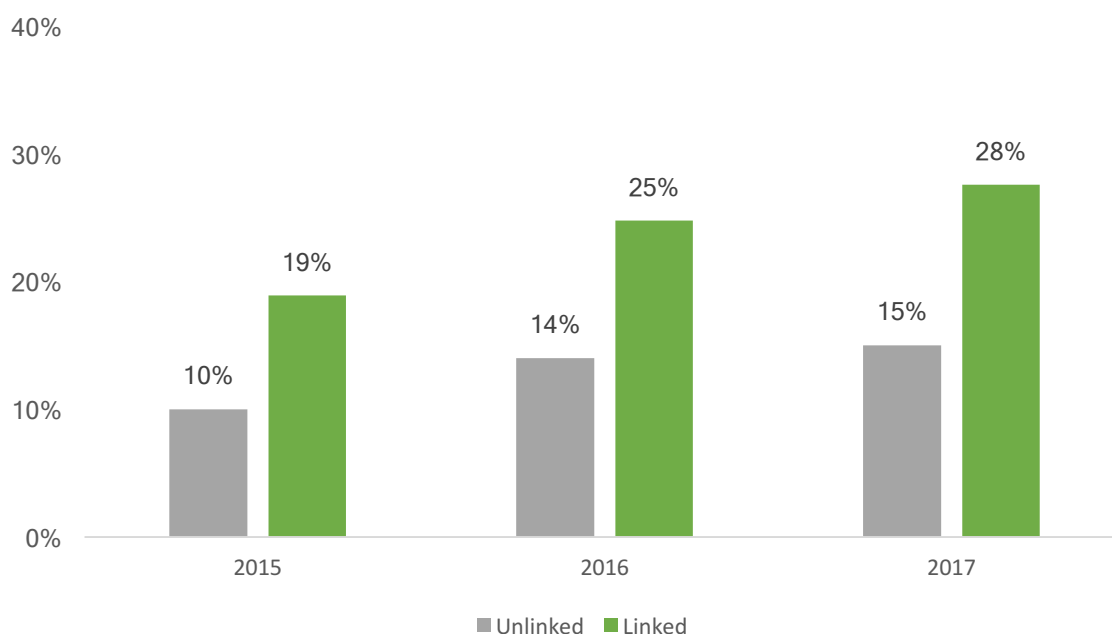
Chart 3: Median return on savings: Rwanda



Overall in Cote d'Ivoire, linked groups are earning a ROS that is 85% higher than unlinked groups. This is based on the median ROS. If we compare average ROS, the difference is a full 250%. In 2017, a typical linked group is earning approximately \$11.50 USD more per member than a typical unlinked group. Furthermore, the difference in the median ROS has grown from 9 percentage points to 13 percentage points since 2015.

Like Rwanda, groups in Cote d'Ivoire with more female participation tend to have higher median returns. A typical linked group with a high proportion of women members is earning close to \$14.14 more per member than a comparable unlinked group. For groups with moderate proportions of women, a typical linked group earns \$6.06 more than an unlinked group. For groups with low proportions of women members, a typical linked group earns \$1.60 more than an unlinked group.

Chart 4: Median return on savings: Cote d'Ivoire



Return on Savings by Multiple Group Characteristics

However, the upward trend in return on savings is not consistent for all types of savings groups within the POWER/PROFIR project. Both the proportion of women within the group membership as well as the typical attendance rate of the group members has a statistically significant impact on the trajectories. The return on savings calculations have been calculated by standardizing the rate according to the age and situation of the group.

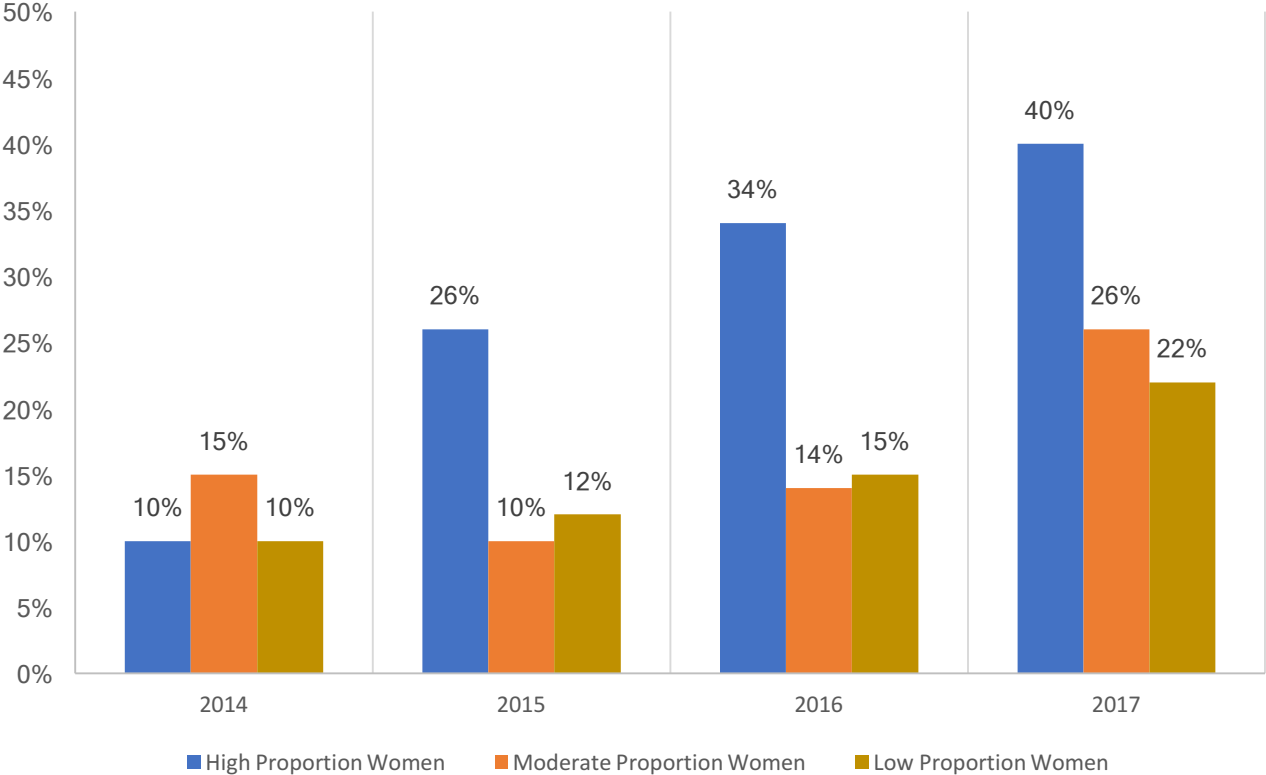
Among Rwanda groups, 51% are classified as having a high proportion of women, meaning that more than 85% of their members are women. 28% of groups have a moderate (70-85%) proportion of women members. And 22% of groups have less than 70% of their group members as women, which puts them into the low proportion of women category.

Within Cote d'Ivoire, a total of 64% of groups have a high proportion of women, 11% of groups have a moderate proportion of women members, and 25% of groups have a low proportion of women members, categorized as less than 70% of their membership.

Within Rwanda, there is a clear distinction between groups that have a high proportion of women (86% of membership or more) and all other groups. Groups with the most women are outperforming all other groups significantly. In 2017, groups with the highest proportion of women had a ROS of 40% while groups with a moderate proportion of women (between 70-85%) and groups with a low proportion of women (less than 70%) had a ROS of only 26% and 22%, respectively.

All of the groups started in a similar range – with an ROS between 10% and 15% in 2014. By 2015, the 26% ROS for groups with a high proportion of women was more than double that of group with moderate and low proportions. However, this gap has begun to narrow recently. In 2017, the ROS for groups with a high proportion of women was 54% higher than groups with a moderate proportion and 82% higher than groups with a low proportion.

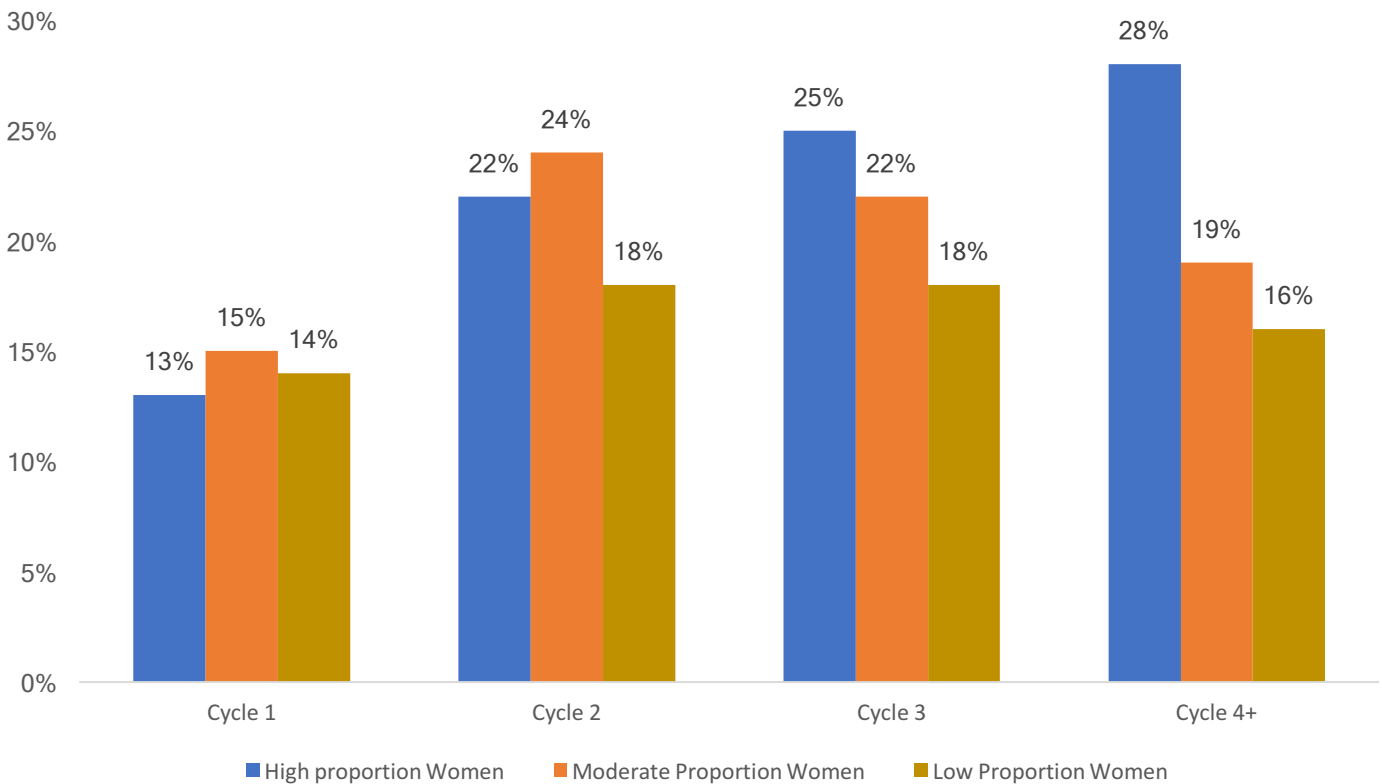
Chart 5: Return on Savings by gender: Rwanda



High proportion of women = More than 85%; Moderate proportion of women = Between 70% and 85%; Low proportion of women = Less than 70% women.

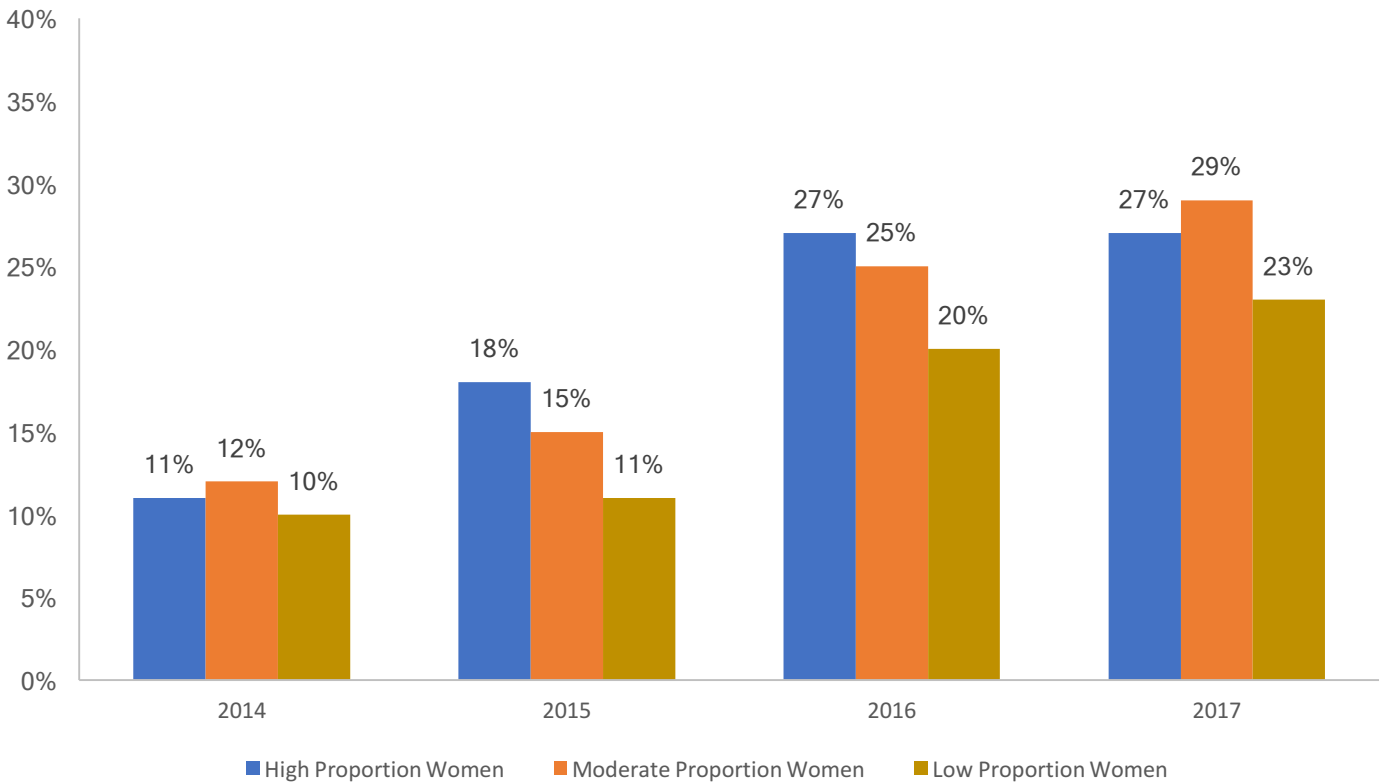
When we control for both the age of the group as well as the gender composition of the group, we can see that the significant improvement for groups with high proportions of women members is most pronounced after the fourth cycle. This suggests that some of the comparative success of groups with a high proportion of women can be attributed to groups with more experience. Furthermore, we can see that groups with a low proportion of women consistently underperformed after the first cycle.

Chart 6: Return on Savings, by gender and group age: Rwanda



In Cote d'Ivoire, the differences between the groups based on their gender composition is not as large. All three groups have return on savings that increased from approximately 10% to 25% over the course of the assessment. Nonetheless, groups with high or moderate proportions of women slightly outperform groups with low proportions over the duration of the project. The groups start at similar rates and the low proportion groups end up with returns that are approximately 17% to 26% lower than those of groups with more women. This difference is statistically significant. Meanwhile, the 7% difference between groups with a moderate and high proportion of women is not statistically significant.

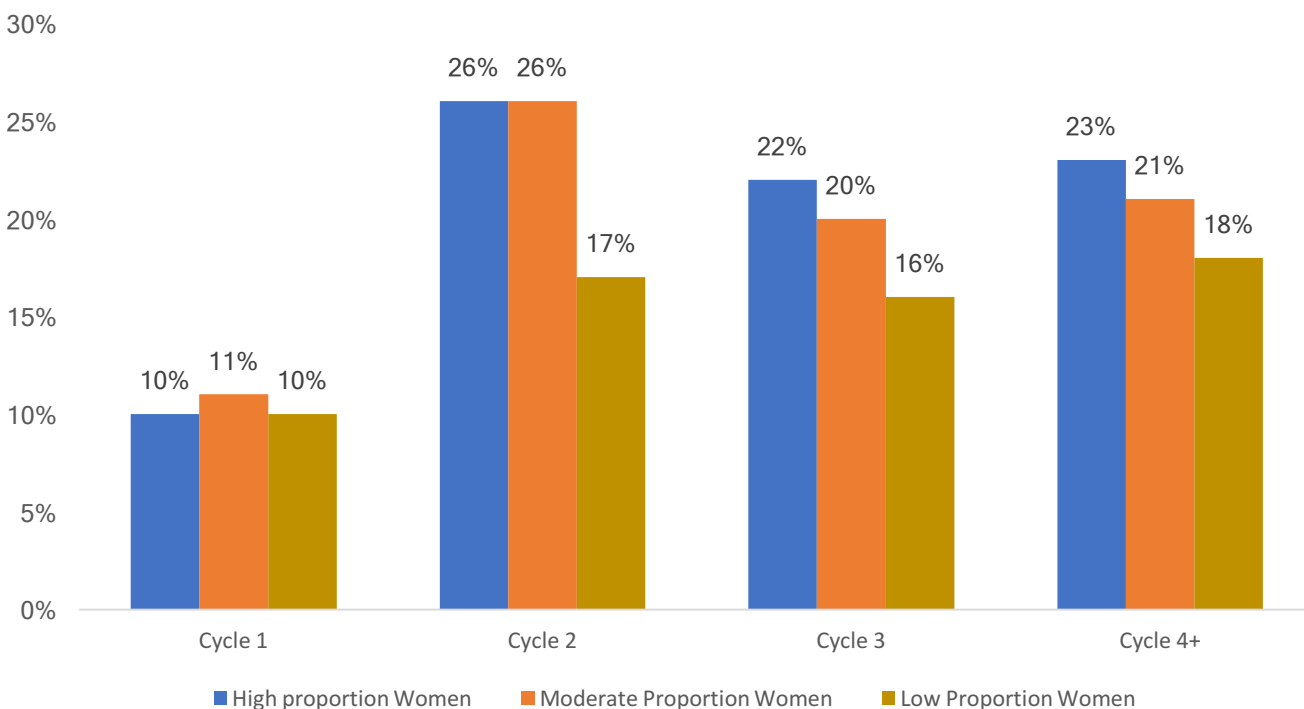
Chart 7: Return on Savings by gender: Cote d'Ivoire



High proportion of women = More than 85%; Moderate proportion of women = Between 70% and 85%; Low proportion of women = Less than 70% women.

For groups in Cote d'Ivoire when we control for both groups age and group gender simultaneously the trends remain very similar to the trends by gender composition alone. All three types of groups start at similar rates, but performance diverges after the first cycle. At the second cycle returns grew by more than 135% for groups with high and moderate proportions of women. Meanwhile, ROS grew at half that pace for groups with low proportions of women. Even at the fourth cycle when performance for groups with low and moderate levels of women declines slightly, groups with low levels of women members never catch up.

Chart 8: Return on Savings, by gender and group age: Cote d'Ivoire



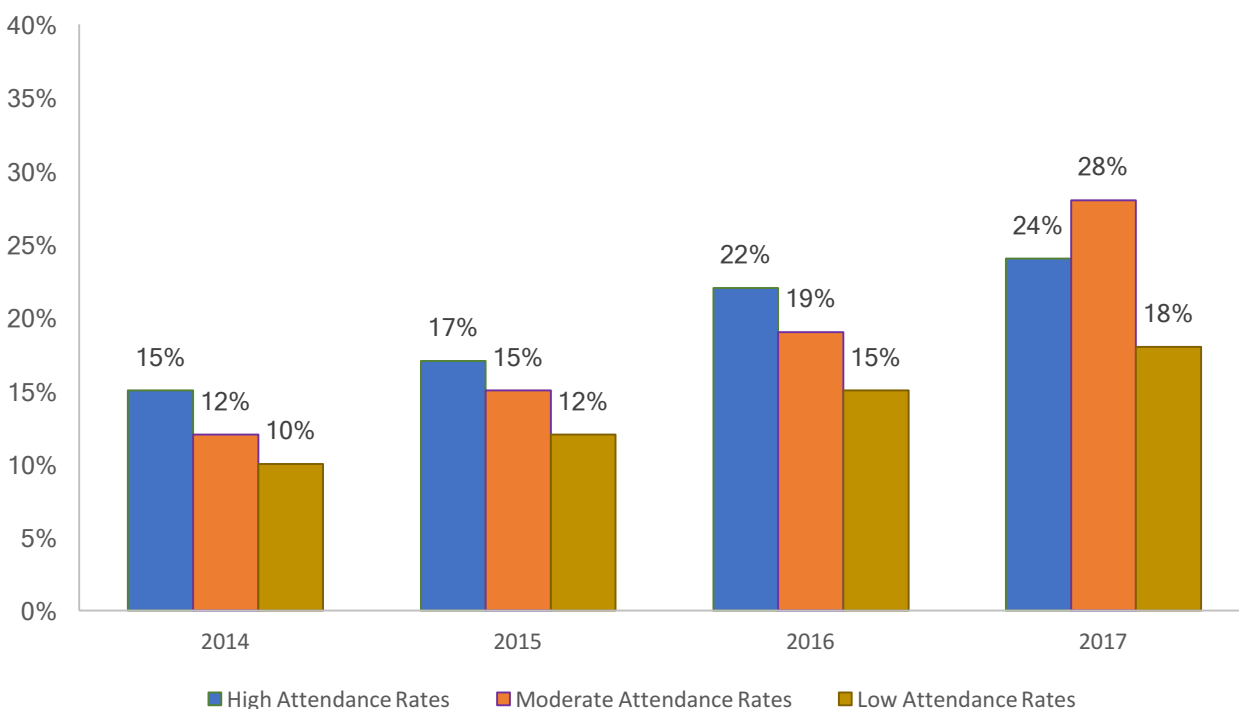
The attendance rate is another group characteristic that has a significant impact on the ROS of the savings groups in the POWER/Profir project. Attendance is critical as it brings out levels of groups cohesion and trust. As with gender composition, the differences are stronger within the groups from Rwanda than the groups from Cote d'Ivoire.

In Rwanda, the groups with high attendance rates (over 98% average attendance) and moderate attendance (between 85 and 97% attendance) have rates of return 33% to 56% higher in 2017 than those groups with low attendance (less than 85% attendance on average). This gap in the ROS between groups with lower and higher levels of attendance was consistent over the course of the project, with low attendance groups performing the worst every year.

Between 2014 and 2016 the groups with the highest attendance rates performed best. This difference is statistically significant. But in the first quarter of 2017, their trajectory flattened out and they are averaging a 24% ROS in 2017. Groups with moderate attendance performed similar to, but slightly below, groups with high attendance rates until 2017. In 2017, the ROS for these groups grew by 47% from 2016.

We tested for interaction effects between attendance rates and age of group but no such effect exists. Attendance rates do not have significant fluctuations within the project as groups mature.

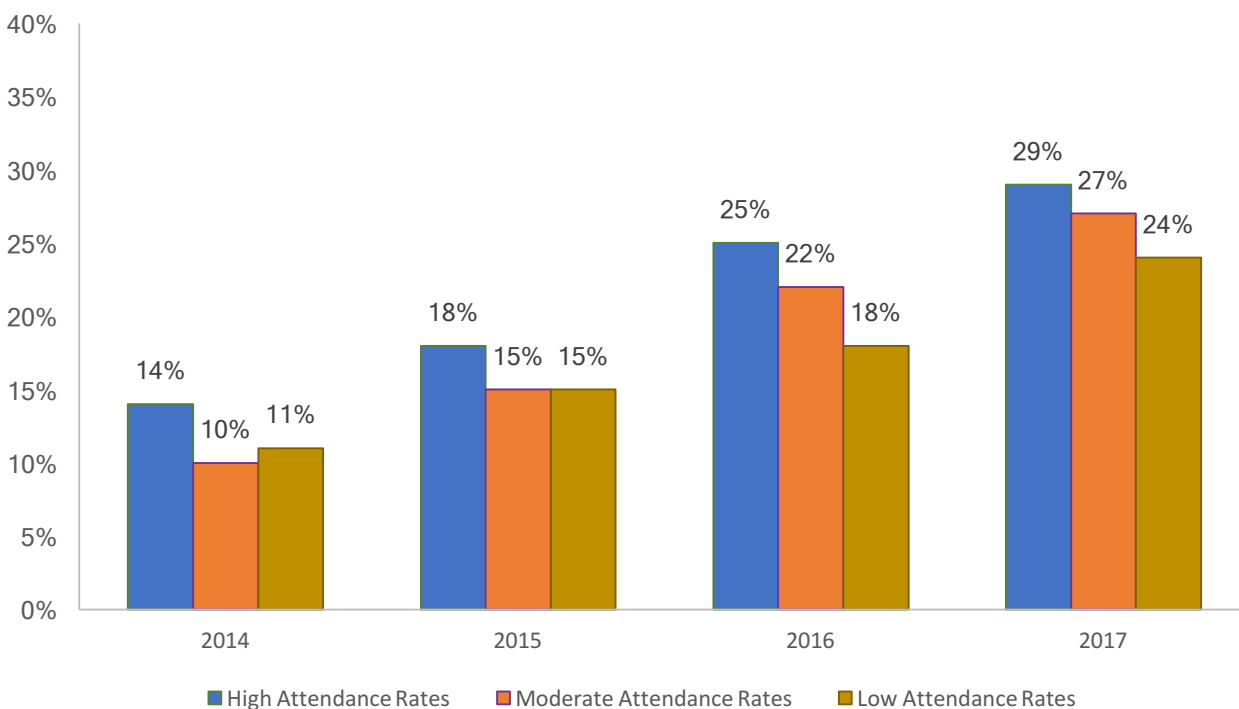
Chart 9: Return on Savings by attendance rates: Rwanda



High attendance rates = 98% and over; Moderate attendance rates = Between 85 and 97% average attendance rates; Low attendance rates = Less than 85% on average.

In Cote d'Ivoire, there are no significant differences in ROS between groups based on attendance rates. In 2017, groups with the highest attendance rates have an ROS of 29%, while groups with moderate attendance rates are at 27% and groups with low attendance rates are at 24%. In generally, attendance more than doubled between 2014 to 2017 for all groups. We tested for significant interactions between attendance and group age and composition but found no significant trends. There are no significant variations between group attendance rates as they mature. The impact of group gender composition alone is much more impactful on rate of return than group attendance or the combination of group attendance and gender composition.

Chart 10: Return on Savings by attendance rates: Cote d'Ivoire



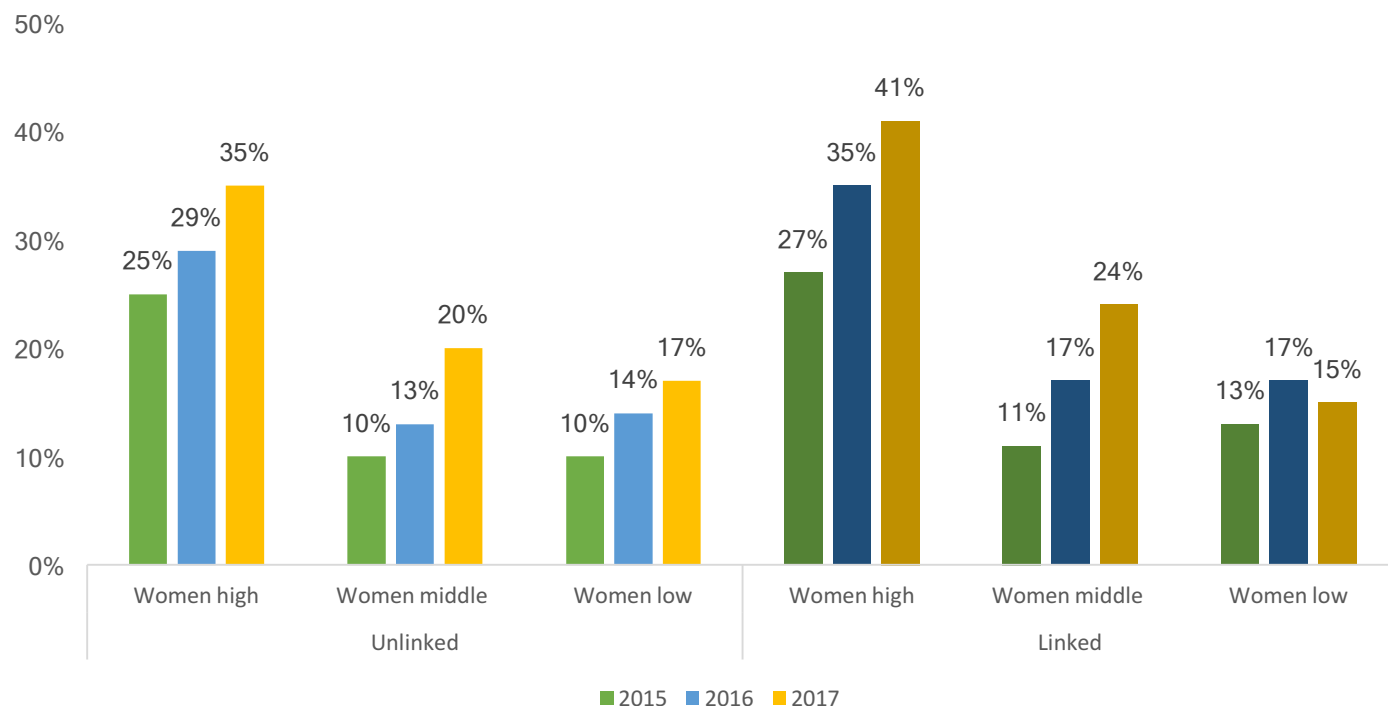
High attendance rates = 98% and over; Moderate attendance rates = Between 85 and 97% average attendance rates; Low attendance rates = Less than 85% on average.

In Rwanda, when we control for both linkage status and group gender levels simultaneously the trends remain very similar to the trends for linkage status composition alone. For all levels of women’s participation, the ROS was higher in linked groups. In 2017, groups with a high proportion of women had a 25% ROS in unlinked groups and a 41% ROS in linked groups. Linkage was more successful in groups with low levels of women’s participation as well, though the difference in ROS (5 percentage points) between linked and unlinked is much smaller than groups with a high level.

Furthermore, across all years, the ROS for groups with high proportions of women was more than double that of groups with low proportions for both linked and unlinked groups. In 2017, the ROS for groups with high levels of women was 26 percentage points higher in linked groups and 18 percentage points higher in unlinked groups.

For groups with moderate and high proportions of women, the ROS grew more from 2015 to 2017 in linked groups than unlinked groups. For groups with high levels of women, the ROS grew by 52% in linked groups and 40% in unlinked groups. While their ROS is still behind that of groups with high proportions of women, groups with moderate proportions of women saw the highest growth of ROS – 118% for linked groups and 100% for unlinked groups.

Chart 11: Return on Savings by Gender Composition and Linkage: Rwanda

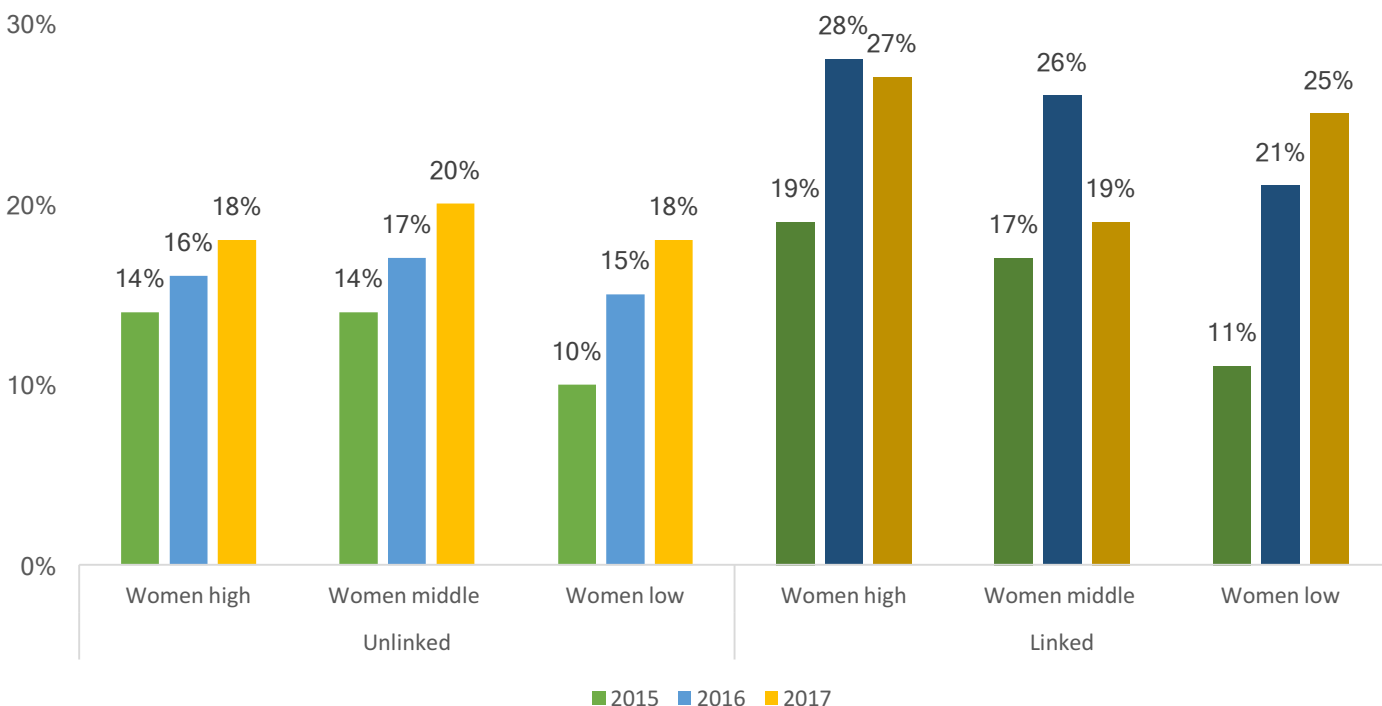


In Cote d'Ivoire, linked groups tend to outperform unlinked groups at every level of women's participation. However, for both linked and unlinked groups, the differences among the groups based on their gender composition is not as large as in Rwanda. In 2017, groups with a high proportion of women had a 18% ROS in unlinked groups and a 27% ROS in linked groups. Linked groups with a low proportion of women also outperformed their unlinked counterparts by 7 percentage points. For groups with a moderate proportion of women, the ROS was approximately 20%, regardless of linkage status.

For unlinked groups, the performance of groups was similar across all levels of women's participation. In 2015, groups with moderate to high proportions of women had an ROS of 14%, while groups with low proportions of women had an ROS of 10%. By 2017, all groups had an ROS of 18% to 20%.

For linked groups, the relationship between gender level and the ROS seems to fluctuate over time. In 2015, groups with high and moderate proportions of women outperform groups with low proportions by 8 and 6 percentage points, respectively. By 2017, the ROS of groups with low proportions of women were 2 percentage points lower than groups with high proportions and 6 percentage points higher than groups with moderate proportions. Furthermore, groups with low proportions of women experienced the highest growth in their ROS (127%) from 2015 to 2017.

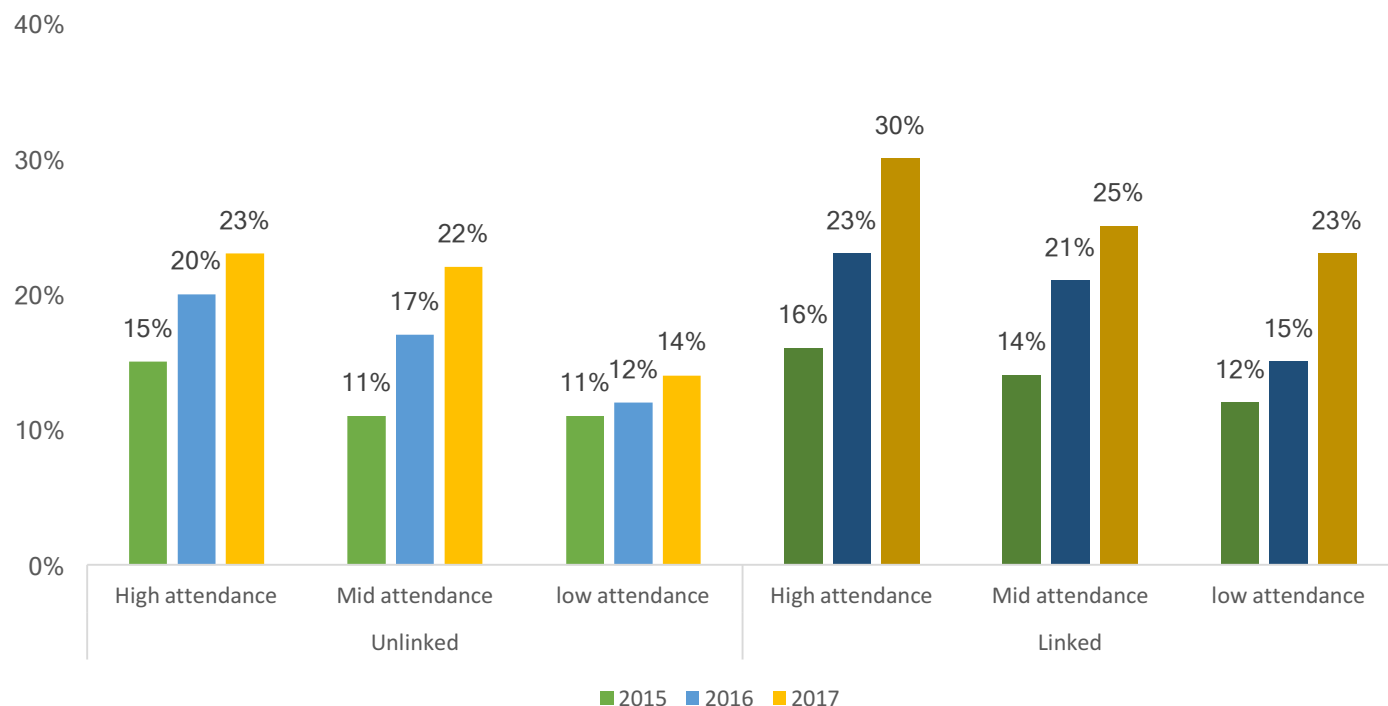
Chart 12: Return on Savings by Gender Composition and Linkage Cote d'Ivoire



In 2015, the ROS of unlinked and linked groups in Rwanda was similar when controlling for attendance level – the ROS of linked groups was only 1 to 3 percentage points higher in linked groups than in unlinked groups. By 2017, it was clear that linked groups outperformed unlinked groups, regardless of attendance. In 2017, the ROS of linked groups was 9 percentage points higher for low attendance groups, 3 percentage points higher for moderate attendance groups, and 7 percentage points higher for high attendance groups.

Overall, high and moderate attendance groups had a higher ROS than low attendance groups, though this relationship is stronger for unlinked groups than linked groups. In 2017, unlinked groups high and moderate attendance had an ROS that was 57% to 64% higher than low attendance groups. For linked groups, the ROS of high attendance groups was 30% higher than that of low attendance groups while the ROS of moderate attendance groups was only 9% higher than that of low attendance groups.

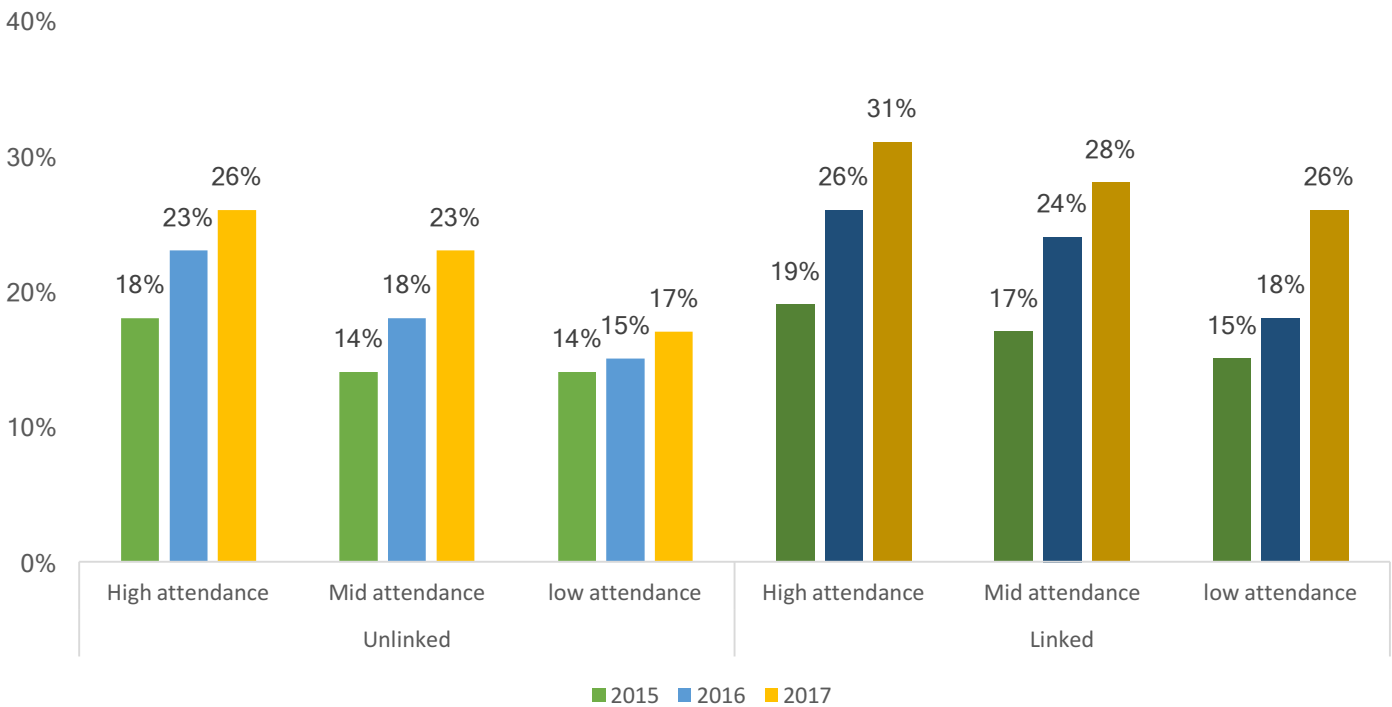
Chart 13 Return on Savings by Attendance Rate and Linkage Rwanda



Like Rwanda, in 2015, the ROS of unlinked and linked groups in Cote d'Ivoire was similar when controlling for attendance level. However, in 2016 and 2017, the performance of unlinked and linked groups diverged. By 2017, the ROS of linked groups was 7 percentage points higher for low attendance groups and 5 percentage points higher for moderate and high attendance groups.

Groups with higher attendance level also tended to outperform groups with lower attendance levels, regardless of linkage status. In 2017, unlinked groups with high attendance had an ROS that was 13% higher than groups with moderate attendance and 53% higher than groups with low attendance. Similarly, the ROS of linked groups with high attendance was 10% to 20% higher than the ROS of groups with moderate or low attendance.

Chart 14 Return on Savings by Attendance Rate and Linkage Cote d'Ivoire

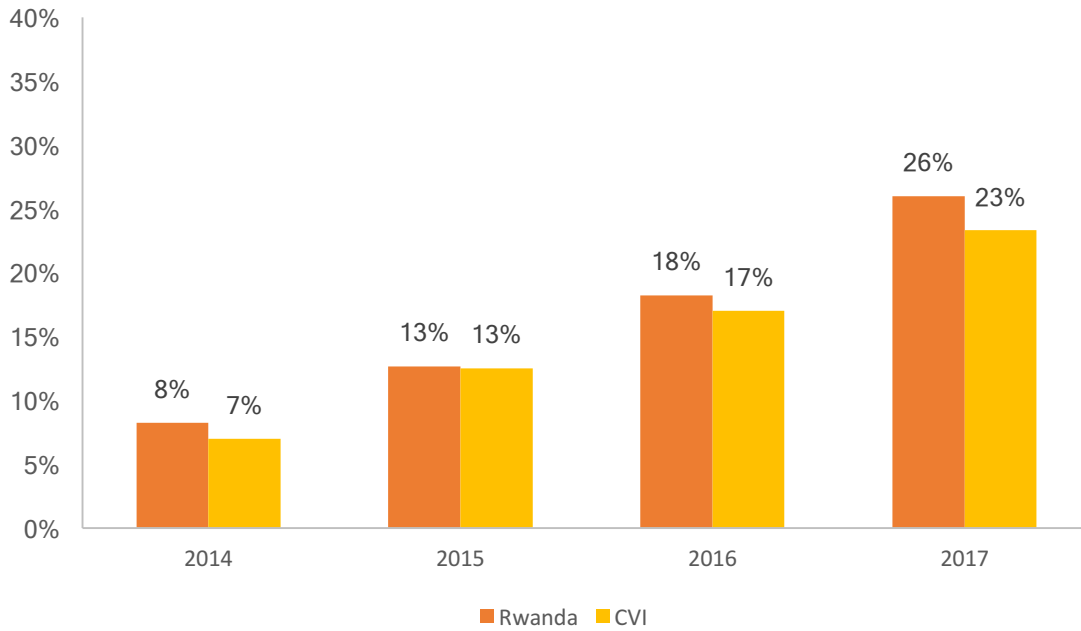


Part 2: Return on Assets

The metric Return on Assets (ROA) measures the yield the group is achieving on its assets. This is largely the amount of increase in total assets the group is seeing relative to the group's investments. The calculation is a standardized version of the groups profits divided by their total accumulated assets. The calculations for return on savings is made using the MIS data from all the groups in the project, both linked and unlinked. The return on assets calculations have been calculated by standardizing the rate according to the age and situation of the group.

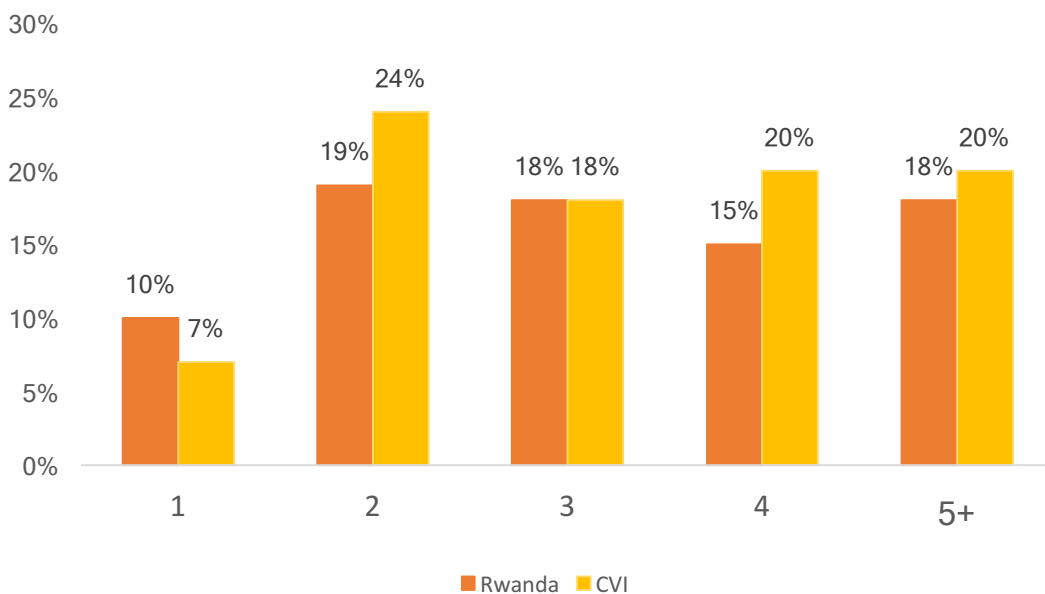
The average return on assets for POWER/Profir savings groups have had a positively increasing trajectory over the years. The groups in both countries have performed quite similarly. In Rwanda, the 2014 ROA was 8% while in Cote d'Ivoire is was 7%. There have been statistically significant increases over time with the ROA rates in 2017 at 26% for Rwanda and 23% for Cote d'Ivoire.

Chart 15: Return on Assets



When we look at trends in Return on Assets for groups by age (measured by cycles) rather than looking only at the year, we find that groups achieve a rapid increase in ROA within their earliest cycles. Then after the second cycle, groups in both countries achieve a steady rate of return. The return varies a bit after cycle 3 but does not fluctuate in a statistically significant way. This analysis is for all groups within the project.

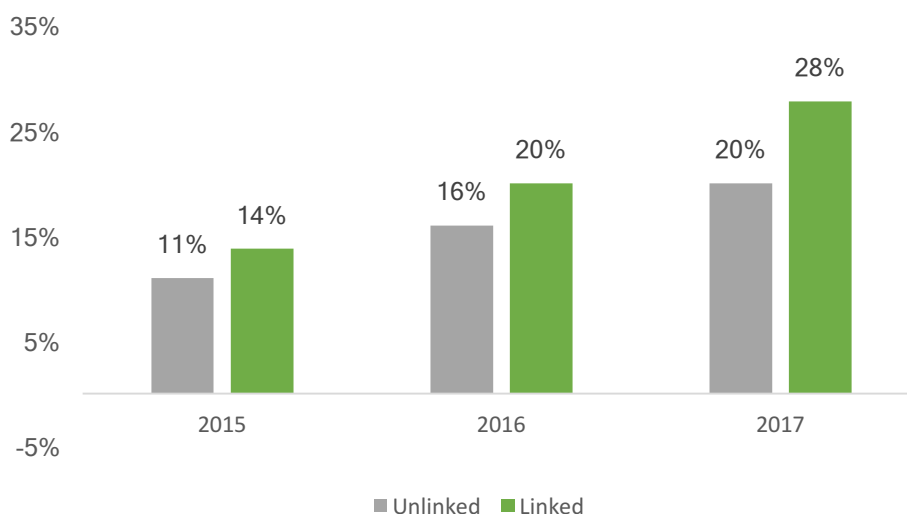
Chart 16: Return on Assets by Group Age



Return on Assets by Linkage Status

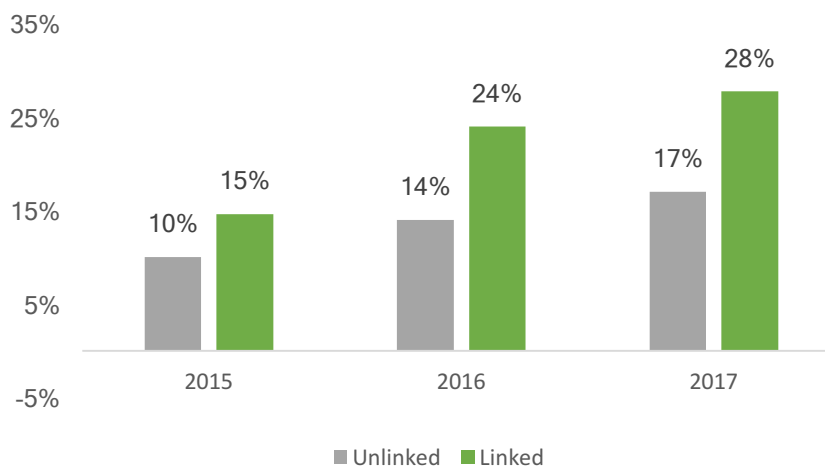
Overall in Rwanda, linked groups are earning a return on assets that is 35% higher than unlinked groups. This is based on the median return on savings. If we compare average ROA, the difference is a full 116%. But the averages are much less stable than the medians. Moreover, the gap in median ROA between unlinked and linked groups widened over time from 27% in 2015 to 40% in 2017.

Chart 17: Median return on assets Rwanda



Overall in Cote d'Ivoire, linked groups are earning a return on assets that is 63% higher than unlinked groups. This is based on the median return on assets. If we compare average ROS, the difference is a full 146%. But the averages are much less stable than the medians. Like Rwanda, the gap between the unlinked and linked groups continues to widen each year.

Chart 18: Median return on assets Cote d'Ivoire

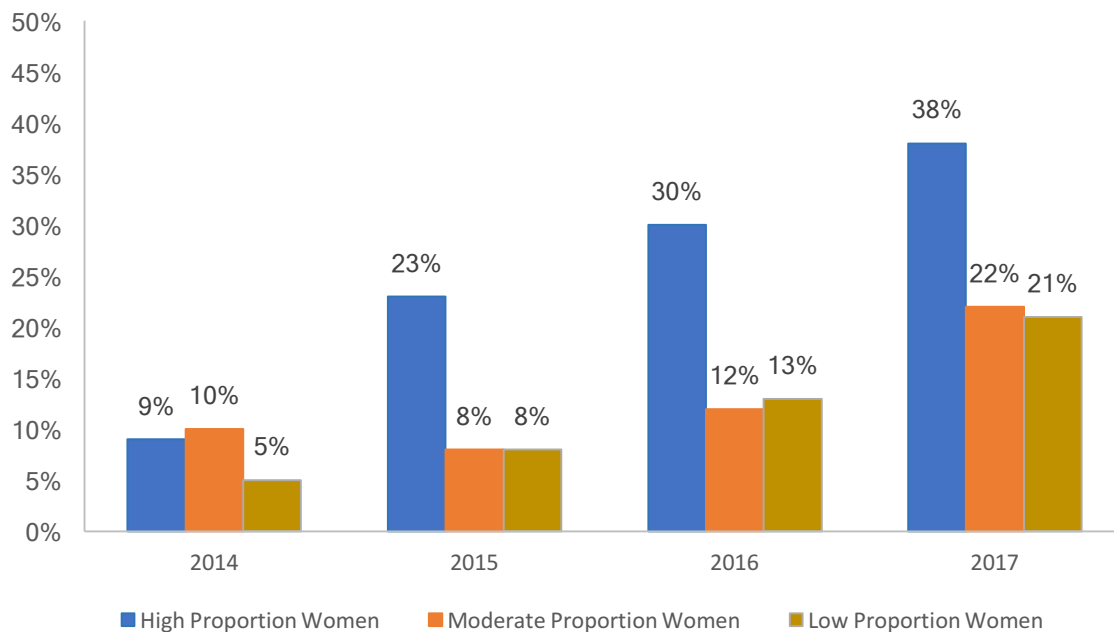


Return on Assets by Multiple Group Characteristics

As with return on savings, these rates are influenced by the group characteristics such as gender composition and the typical attendance rate.

The trends here are almost identical, with gender composition being a very strong driver of return on assets for groups in Rwanda. Those groups with high proportion on female members performing much better than other groups. Groups with over 85% women achieved a full 17 percentage points higher rate of return than all other groups.

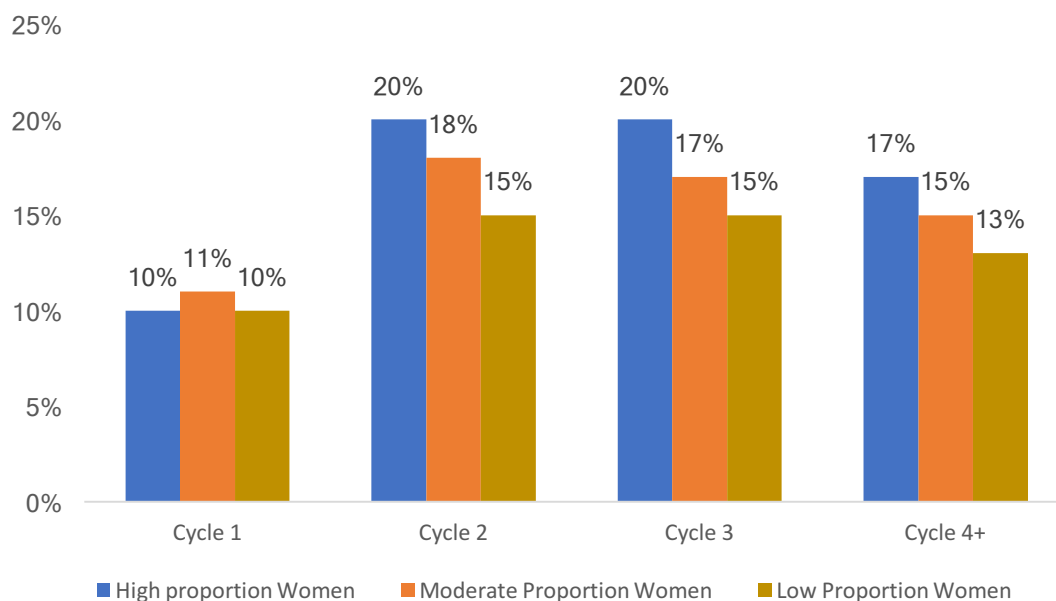
Chart 19: Return on Assets by Gender Rwanda



High proportion of women = More than 85%; Moderate proportion of women = Between 70% and 85%; Low proportion of women = Less than 70% women.

When we look at trends in Return on Assets for groups by age rather than looking only at the year, we find that groups achieve a rapid increase in ROA between cycle 1 and 2 regardless of the level of women in the groups. The ROA of groups with low proportions of women grew 50% between cycles 1 and 2 while the ROA of groups with high proportions of women doubled. Between the second and third cycle the ROA seems to stabilize and then drop slightly by the fourth cycle.

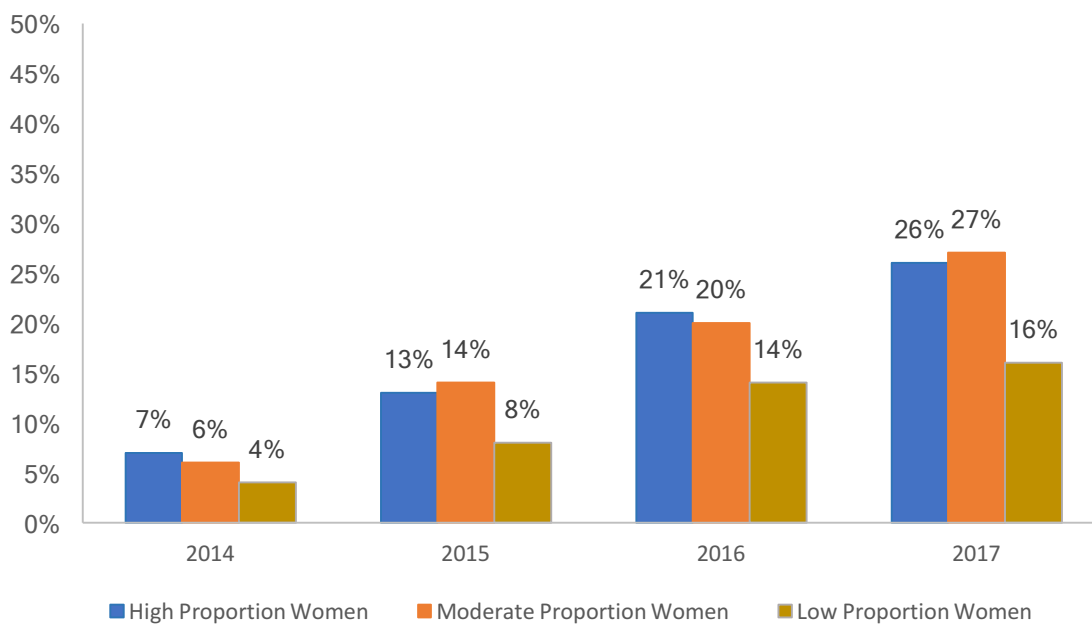
Chart 20: Return on Assets by Gender and Group Age Rwanda



High proportion of women = More than 85%; Moderate proportion of women = Between 70% and 85%; Low proportion of women = Less than 70% women.

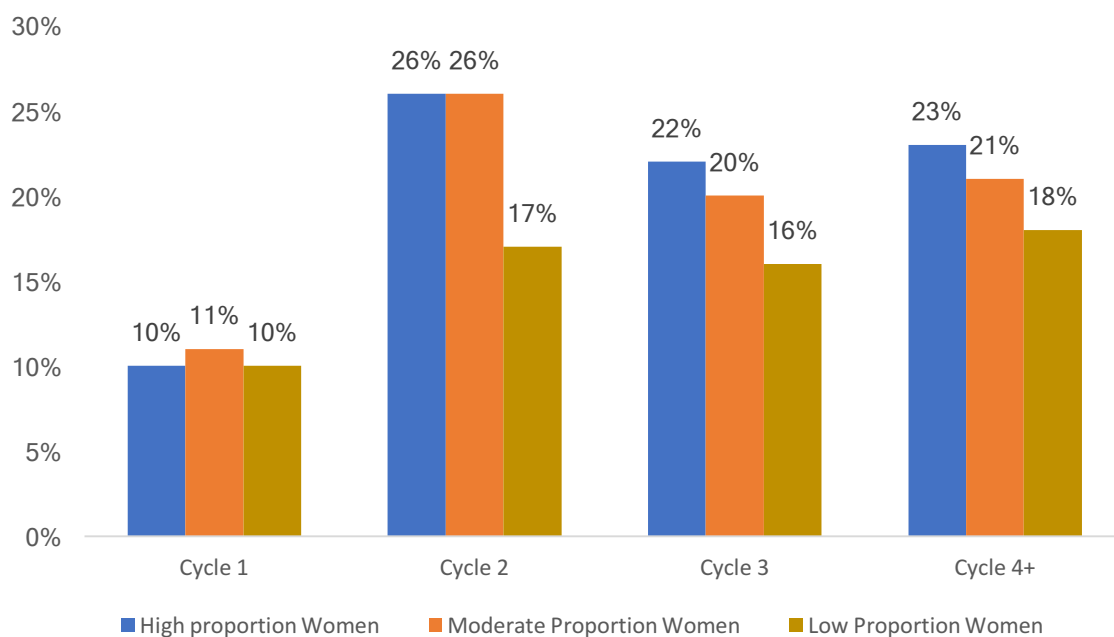
These gender differences are more moderate in Cote d'Ivoire. Groups with both high proportions and moderate proportions of women increased their rate of return at a similar pace. However, this pace was 11 percentage points higher than the return of groups that had low proportions of women.

Chart 21: Return on Assets by Gender Cote d'Ivoire



When we look at growth in ROA by cycle, we find that groups achieve a rapid increase in ROA between cycle 1 and 2 regardless of the level of women in the groups. The ROA of groups with low proportions of women grew 70% between cycles 1 and 2 while the ROA of groups with high and moderate proportions of women grew by more than 160%. However, after the second cycle the ROA seems to decline a bit and then stabilize.

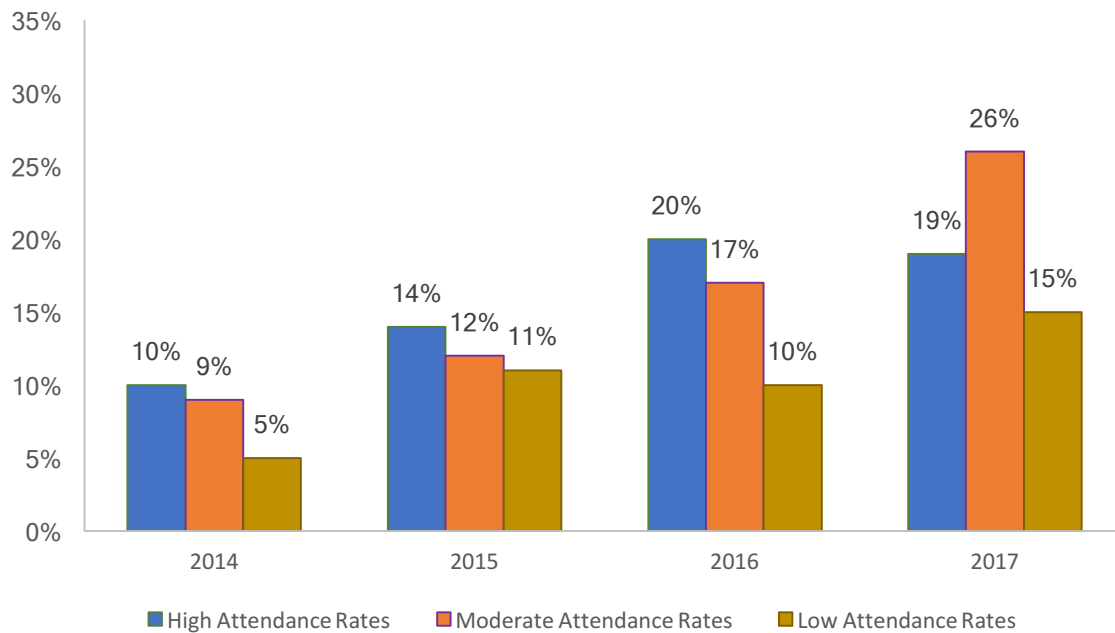
Chart 22: Return on Assets by Gender and Group Age Cote d'Ivoire



High proportion of women = More than 85%; Moderate proportion of women = Between 70% and 85%;
 Low proportion of women = Less than 70% women.

As we saw with our analysis of return on savings, the rate of return on assets is affected by the groups typical attendance rates. In Rwanda, groups with higher attendance rates did better over the years. However, more recently in 2017, the groups with the highest attendance rate dropped. We will explore this dip again at the end of the year 2017 to see if it has remained. In 2017, groups with the highest attendance rates had a return on assets of 19%. Those with moderate attendance rates has ROS of 26%. And those with low attendance rates were at 15%. All of these differences are statistically significant.

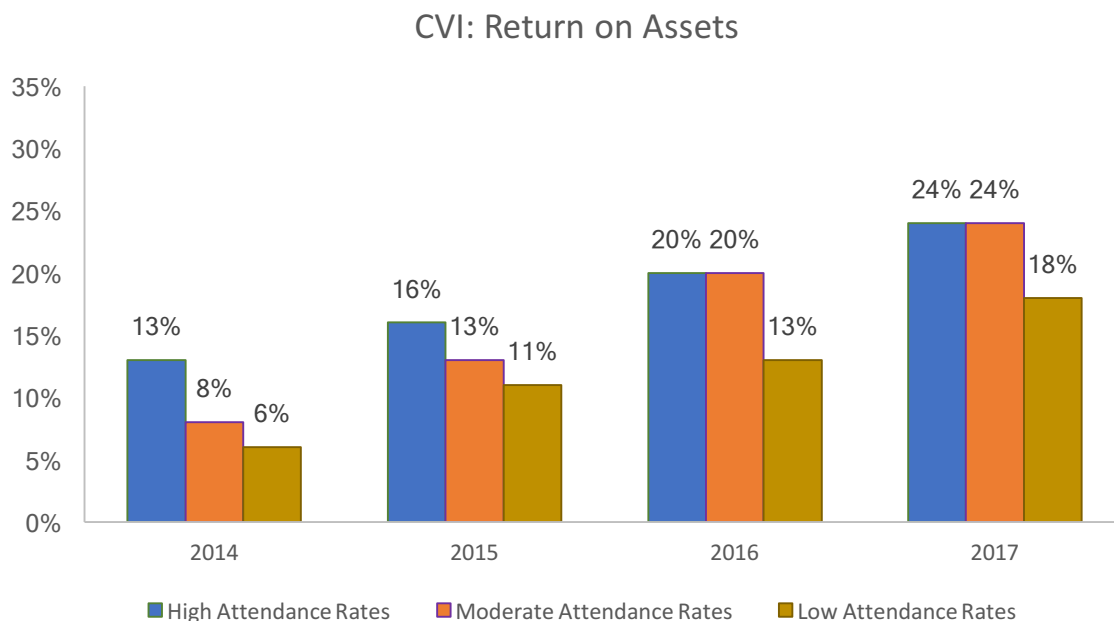
Chart 23: Return on Assets by Group Attendance Rwanda



High attendance rates = 98% and over; Moderate attendance rates = Between 85 and 97% average attendance rates;
Low attendance rates = Less than 85% on average.

In Cote d'Ivoire, the return on assets are almost identical for groups with high and moderate attendance rates. And both of these groups performed better than groups with low attendance rates. For the high groups, their 2017 return on assets was 24%, for moderate groups the return on assets was also 24% and for low attendance groups it was only 18%. The difference between the high attendance groups and low attendance groups is a statistically significant difference. So is the difference between the moderate attendance groups and the low attendance groups. There is no difference in 2017 between the high attendance groups and the moderate attendance groups.

Chart 24: Return on Assets by Attendance Rates Cote d'Ivoire

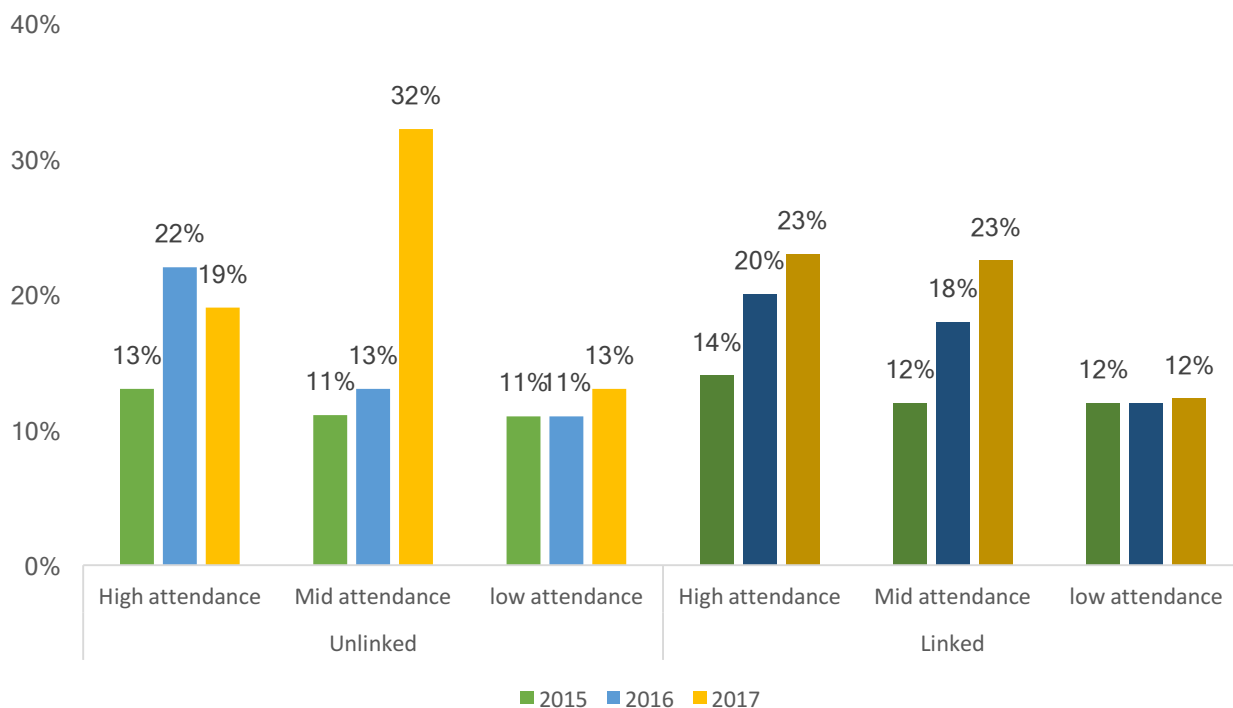


High attendance rates = 98% and over; Moderate attendance rates = Between 85 and 97% average attendance rates; Low attendance rates = Less than 85% on average.

When controlling for attendance, the positive relationship between ROA and linkage status in Rwanda appears less straightforward. In 2015, the ROA of all groups was very similar regardless of linkage status or attendance – the ROA of linked groups was only 1 percentage point higher than that of unlinked groups while the ROA of high attendance groups was only 2 percentage points higher than groups with low or moderate attendance.

While linked groups with high and moderate attendance experienced more consistent growth in the ROA between 2015 and 2017, unlinked groups with moderate attendance actually had the highest ROA of any group in 2017. At 32%, the ROA of these groups is nearly 40% higher than linked groups with high or moderate attendance and nearly 70% higher than unlinked groups with high attendance. Meanwhile, the ROA of unlinked and linked groups with minimal attendance saw minimal change since 2015.

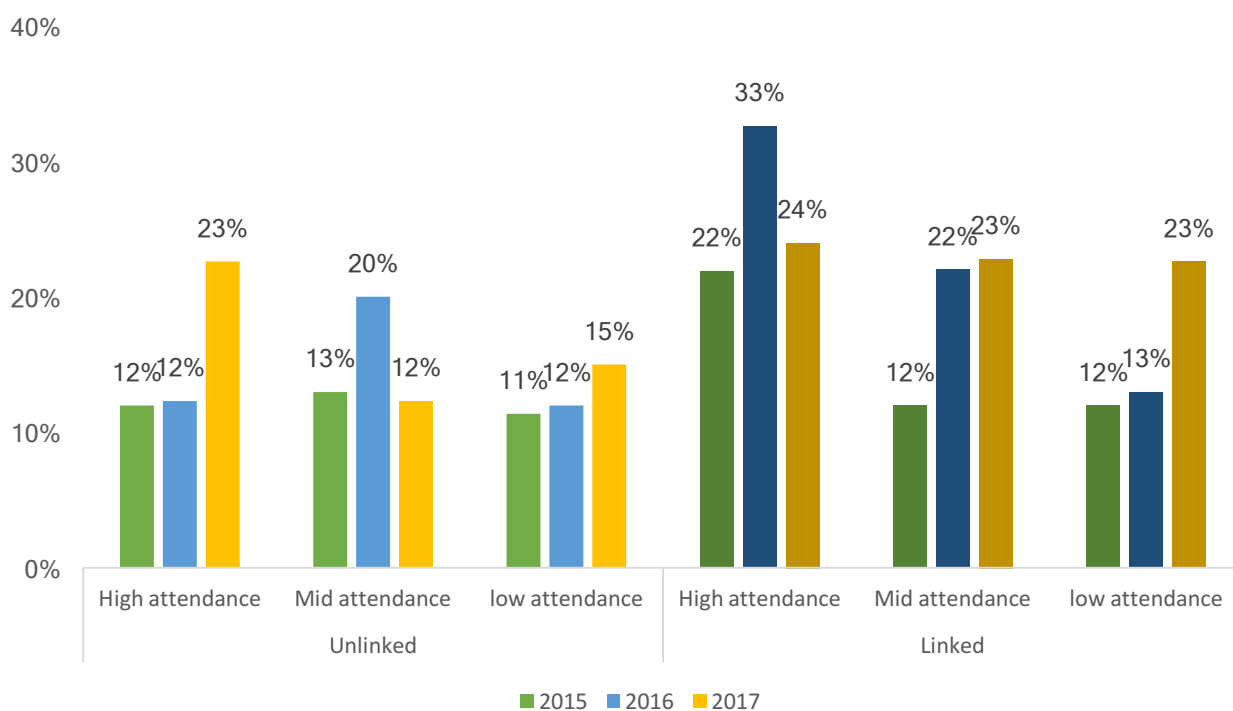
Chart 25: Return on Assets by Attendance Rates and Linkage Rwanda



In Cote d'Ivoire, the positive relationship between linkage status and the ROA remains even when controlling for group attendance levels. In 2015, the ROA of linked groups with high attendance was 70% to 100% higher than the ROA of all other groups. Furthermore, after 2015, linked groups consistently perform better than unlinked groups regardless of attendance. When comparing between linked and unlinked groups in 2017, the ROA is 35% higher in low attendance groups, 92% higher in moderate attendance groups, and 4% higher in high attendance groups.

Within the linked group, attendance seems to have a strong influence on the ROA in the first two years. However, by 2017, all linked groups have an ROA of 23% to 24%. In the unlinked groups, the relationship between attendance and the ROA is inconsistent over time.

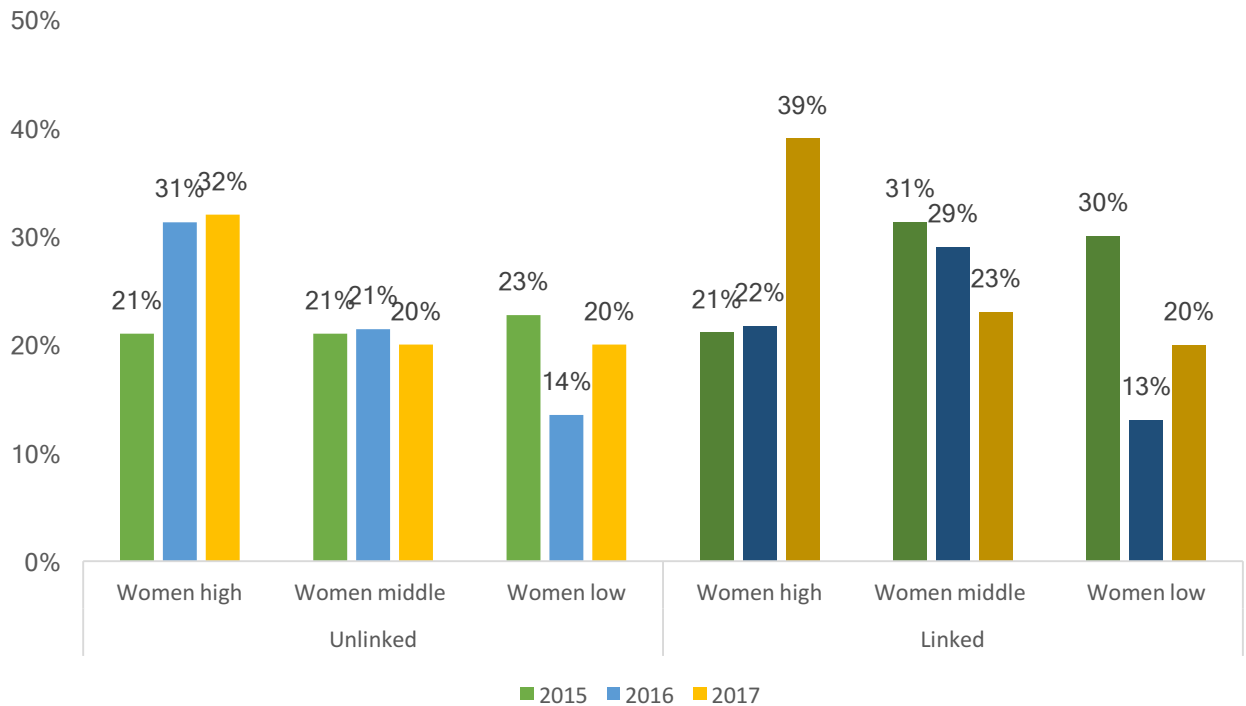
Chart 26 Return on Assets by Attendance Rates and Linkage Cote d'Ivoire



In Rwanda, control for both linkage status and the level of women’s participation reveals that linked groups with high proportions of women experienced the highest increase in their ROA over time. For these groups, the ROA grew by 86% between 2015 and 2017. For all other groups, performance over time was less consistent. For groups with less than 85% women, the ROA of unlinked groups was fairly stable between 2015 and 2017 while the ROA of linked groups declined by 26% to 33%.

In general, linked groups performed better or as well as unlinked groups regardless of the level of women’s participation. For groups with high proportions of women, linked groups had an ROA that was 22% higher than unlinked groups in 2017. For groups with moderate proportions of women the difference between linked and unlinked was 15%. For groups with low proportions, the ROA was the same for linked and unlinked groups.

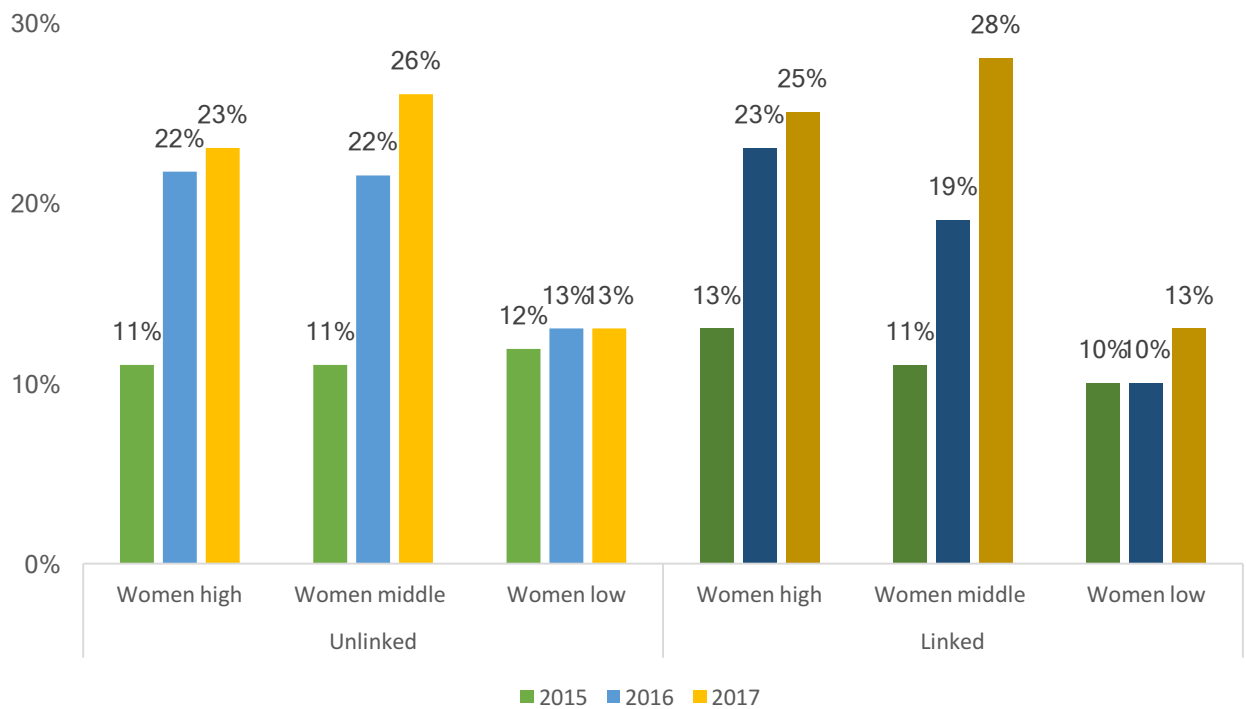
Chart 27 Return on Assets by Group Gender Composition and Linkage Rwanda



When controlling for both linkage status and women’s participation in Cote d’Ivoire we see that the proportion of women has a far greater effect on ROA than linkage. For groups with a high proportion of women, the ROA was above 23% for both linked and unlinked groups in 2017. For groups with a low proportion of women, the ROA was 13%.

Furthermore, groups with a moderate or high proportion of women nearly doubled their ROA from 2015 to 2017 while the ROA of groups with low proportion of women remained flat.

Chart 28 Return on Assets by Group Gender Composition and Cote d'Ivoire

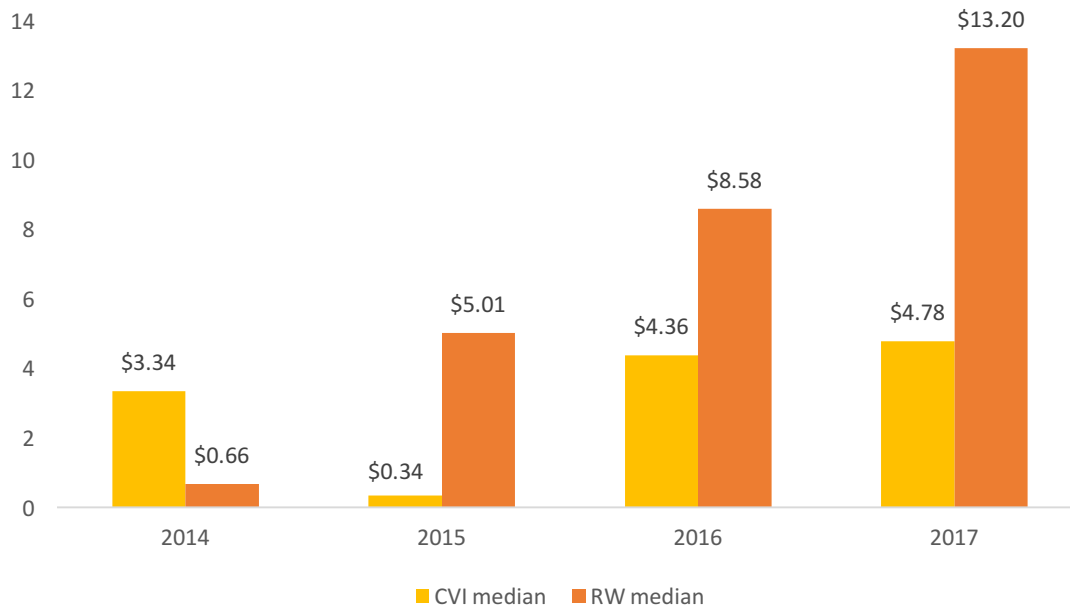


Part 3: Savings Per Member

The total savings per member per cycle is increasing year over year for over 80% of the groups in the POWER/Profir project. The Rwanda groups, both linked and unlinked have experienced higher and more sustained increases in total savings per member. The Cote d'Ivoire groups have been more unsteady in their trajectories from year to year but overall have seen an increase in savings per member between 2014 and 2017. These trends have been adjusted to represent the mix of group maturity within the project at each year.

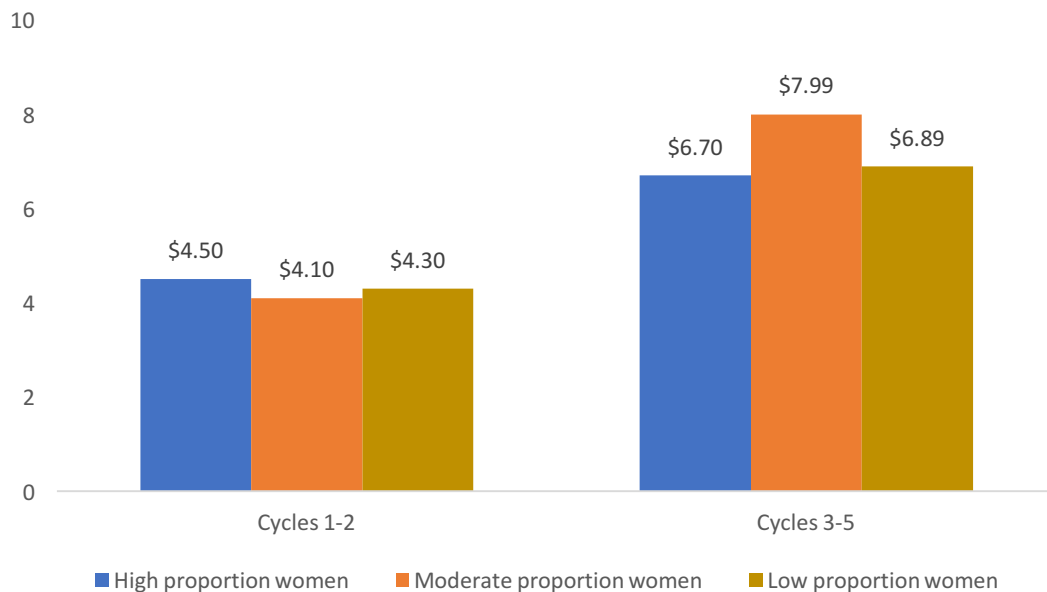
The average change in savings amount between 2014 and 2017 has increased by 2% for Cote d'Ivoire groups and 190% for Rwanda groups.

Chart 29: Median savings per member (USD)



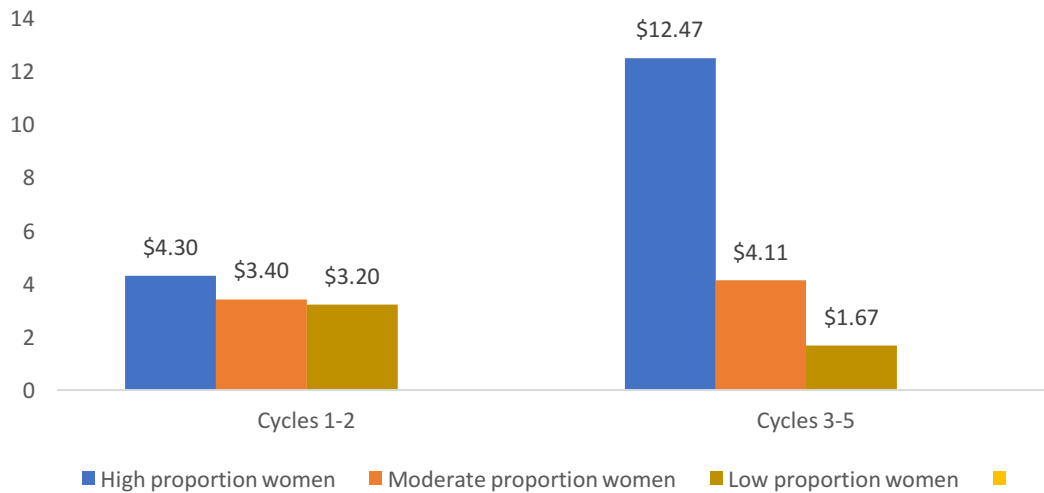
These trends in savings per member are steady when controlled both for group gender composition as well as age of group. A group’s gender composition makes very little difference in savings per member in Cote d'Ivoire. Age of group does contribute towards an increase in savings per members. Savings per member is 60% to 95% higher in cycles 3 to 5 than in cycle 1 to 2.

Chart 30: Savings Per Member by Gender (USD) Cote d'Ivoire



For groups in Rwanda, gender composition has a very significant impact of the savings per member, especially in later cycles. For cycles 3 to 5, groups with high proportions of women had savings 3 to 7 times those of groups with low or moderate proportions of women. As with the other trends, the impact of group composition is much stronger than the impact of group maturity.

Chart 31: Savings Per Member by Gender Rwanda



However, in both countries, groups who are linked with formal savings products are saving significantly more money per member than groups who are not linked. In Cote d’Ivoire, linked and unlinked groups had similar savings per member until 2017, when the savings of linked groups nearly tripled that of unlinked groups. This difference is statistically significant.

Chart 32: Average Savings Per Member by Linkage Status (USD) Cote d'Ivoire



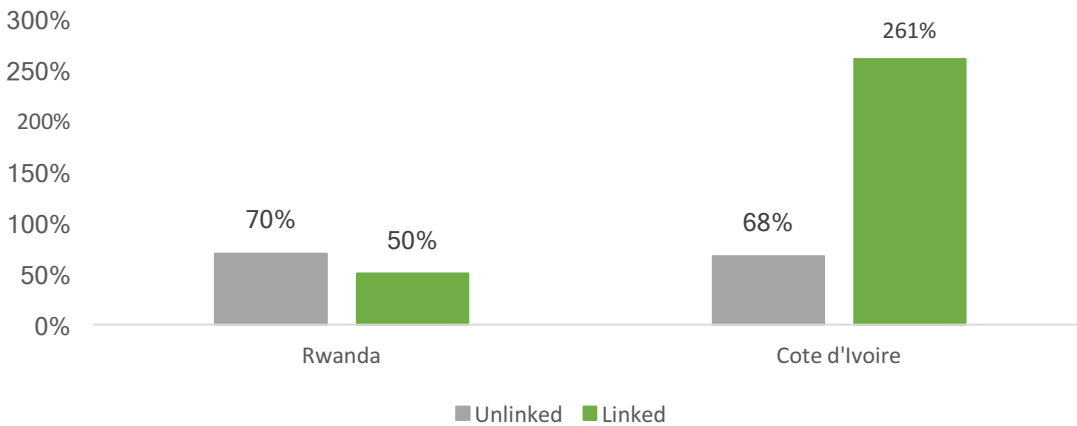
In Rwanda, the gap in savings per member between linked and unlinked groups was more consistent over time. In 2015, savings in linked groups were nearly double those in unlinked groups. In 2017, the gap had only reduced to 72% (or \$10.32 USD). Both linked and unlinked groups experienced a steady growth in savings from year to year.

Chart 33: Average Savings Per Member by Linkage Status (USD) Rwanda



As seen in the chart below, linked groups in Cote d’Ivoire experienced the most dramatic increase in savings between 2015 and 2017. However, in Rwanda, the savings of unlinked members actually grew 20 percentage points more than savings in linked groups. However, this higher growth was not enough to close the gap between linked and unlinked groups.

Chart 34: Percent Change (2015-2017) in Savings Per Member by Linkage Status

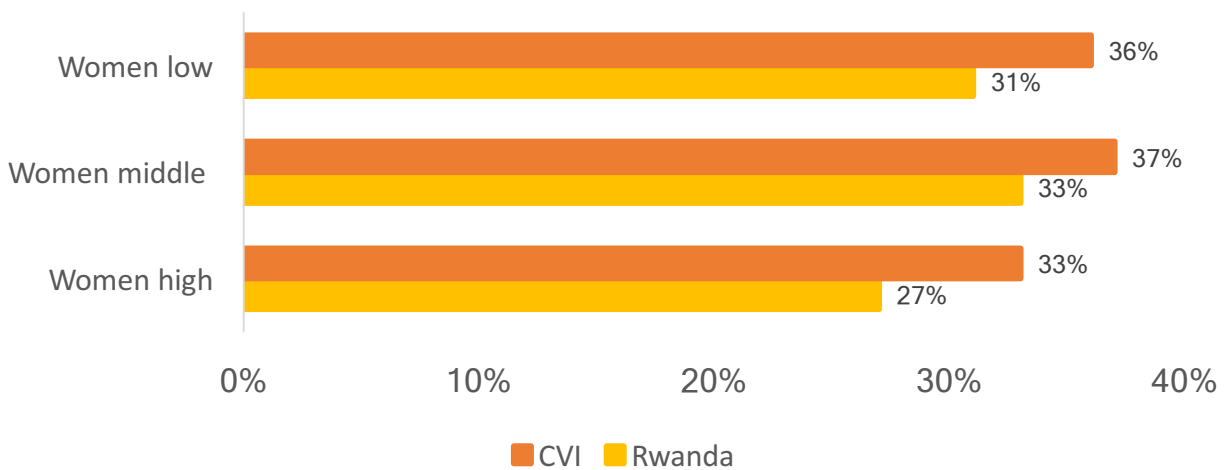


Part 4: Dormancy Rates

The active use of the formal bank accounts is monitored by using the financial service provider data. If a group’s account is not used for over six months the account is considered to be dormant. A group with a dormant account is not actively making deposits or withdrawals from their account. In 2017, 31% of the formal accounts in the Profir Rwanda groups are dormant and 37% of the POWER groups in Cote d'Ivoire have dormant accounts.

Groups with higher proportions of women members are slightly less likely to have dormant accounts. Attendance rate and distance to the bank does not significantly affect the dormancy rate of group accounts.

Chart 35: Dormancy Rates by Gender Composition



High proportion of women = More than 85%; Moderate proportion of women = Between 70% and 85%; Low proportion of women = Less than 70% women.

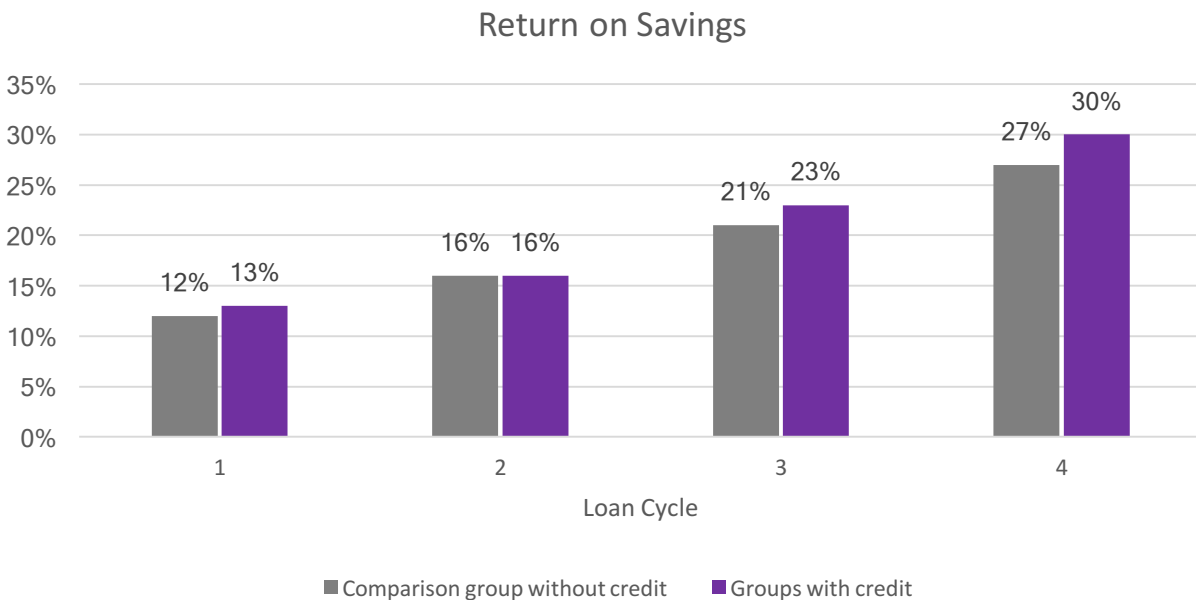
Part 5: Access to Credit

The metric Access to Credit measures whether or not the group has the ability to take a loan from their bank. We look at the overall number of cycles a linked group had access to credit over the duration of the project.

For linked groups in Rwanda, access to credit did not substantially affect any of the core outcome variables. Returns to saving and returns to assets had a highly positive trajectory over the course of the project while attendance was consistent as the number of cycles a group had access to credit grew.

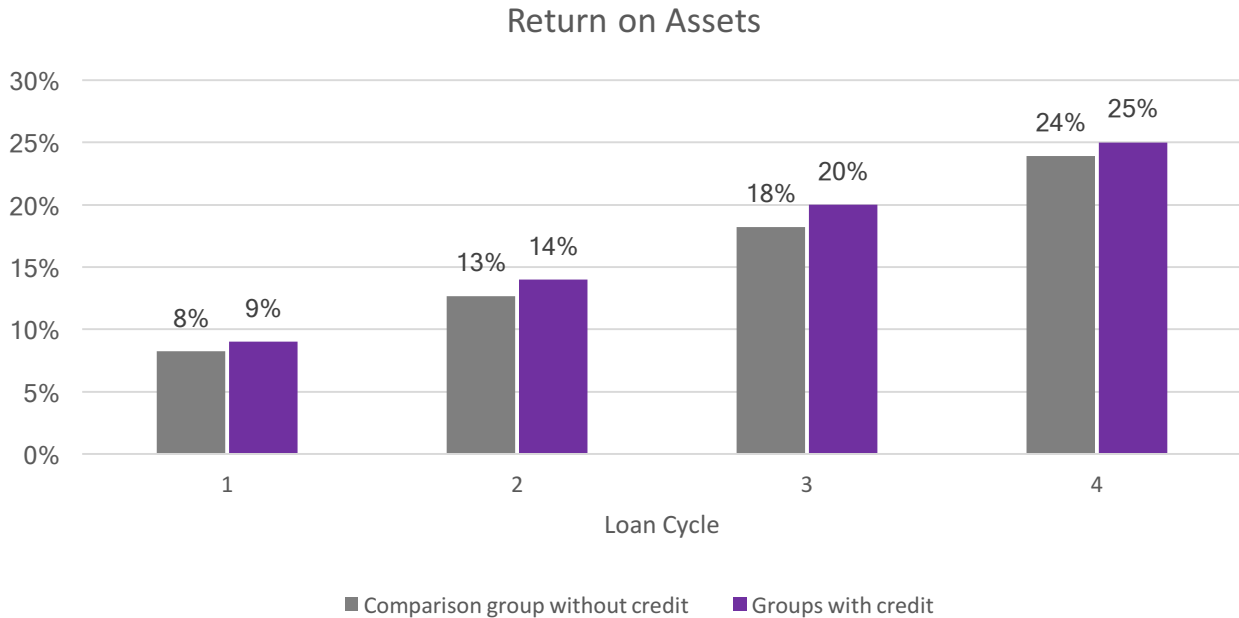
The ROS of linked groups without access to credit is 125% higher after 4 cycles while the ROS of groups with access is 131% higher. Regardless of access to credit, the ROS of linked groups was over 27% after 4 cycles.

Chart 36: Return on Savings for linked groups by access to credit: Rwanda



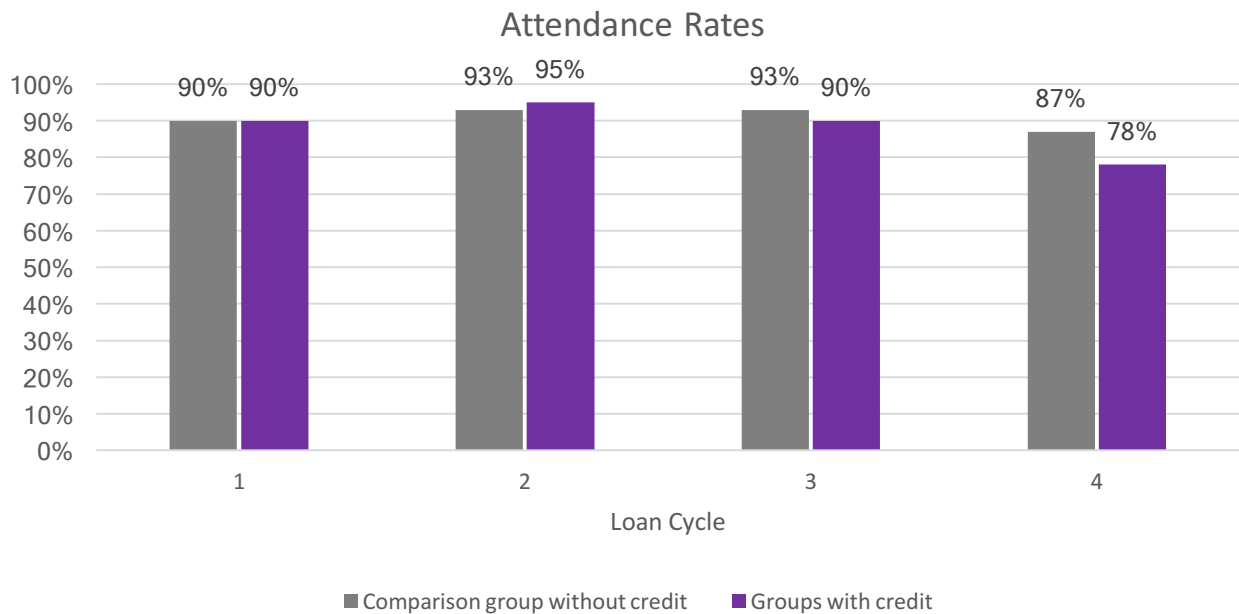
The return on assets nearly tripled over time for linked groups both with and without access to credit. On a cyclical basis, the ROA for groups without access to credit lagged that of groups with access by only 1 or 2 percentage points.

Chart 37 Return on Assets for linked groups by access to credit: Rwanda



For 1 to 3 cycles, average attendance was over 90% for linked groups regardless of whether the group has access to credit. However, by the fourth cycle, attendance declined by 6% for groups without access to credit and 13% for groups with access to credit. We will continue to monitor attendance as more data is received.

Chart 38: Attendance Rates for linked groups by access to credit by Cycle: Rwanda



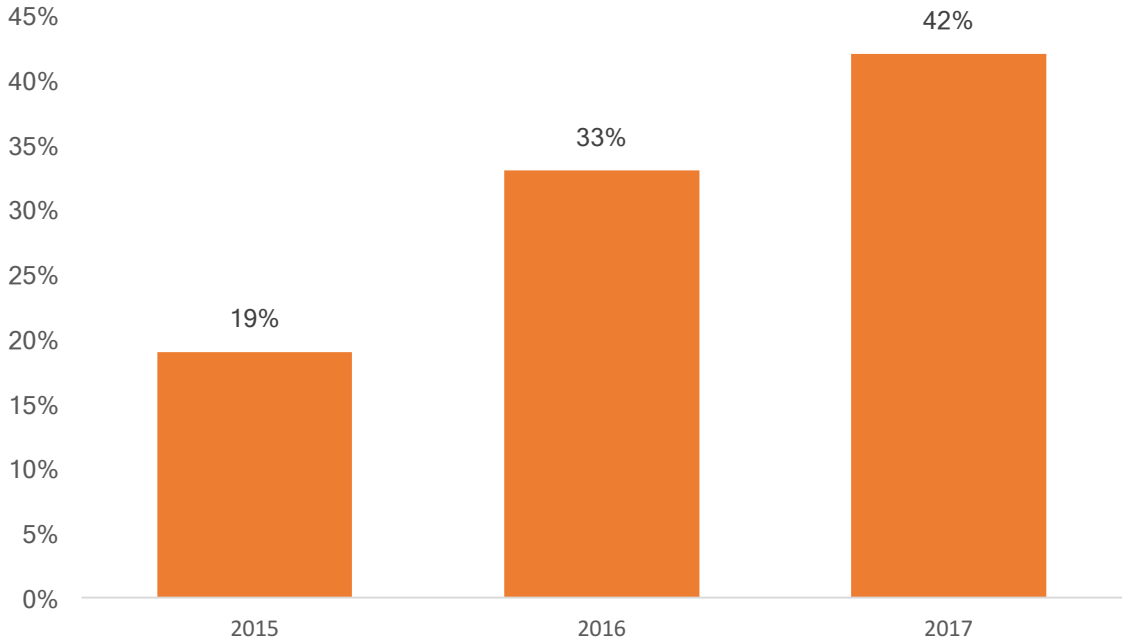
Part 6: Individual Accounts

Individual Accounts

The adoption of individual formal bank accounts by members of linked groups is an assessment of level of adoption and success of the linkage work with the savings groups. The percent of group members who have opened an individual account has been steadily increasing over time. This is true for both countries.

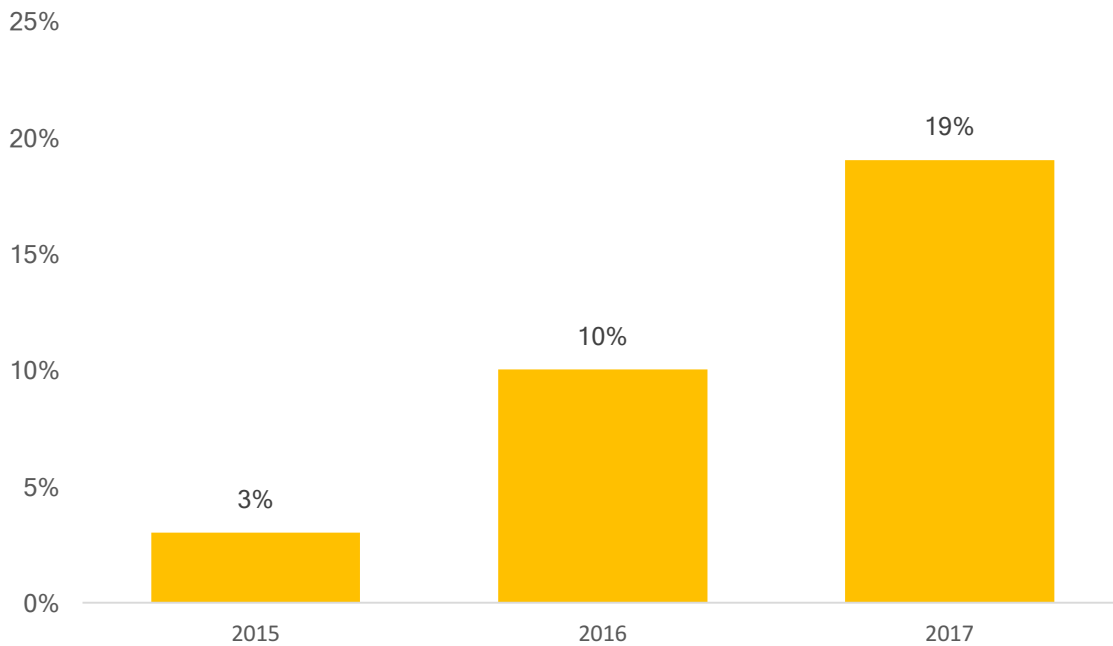
In Rwanda, 42% of people in linked groups had individual accounts in 2017. Moreover, adoption of these accounts more than doubled from 2015 to 2017.

Chart 39: Percent of Linked Project Members with Individual Accounts Rwanda



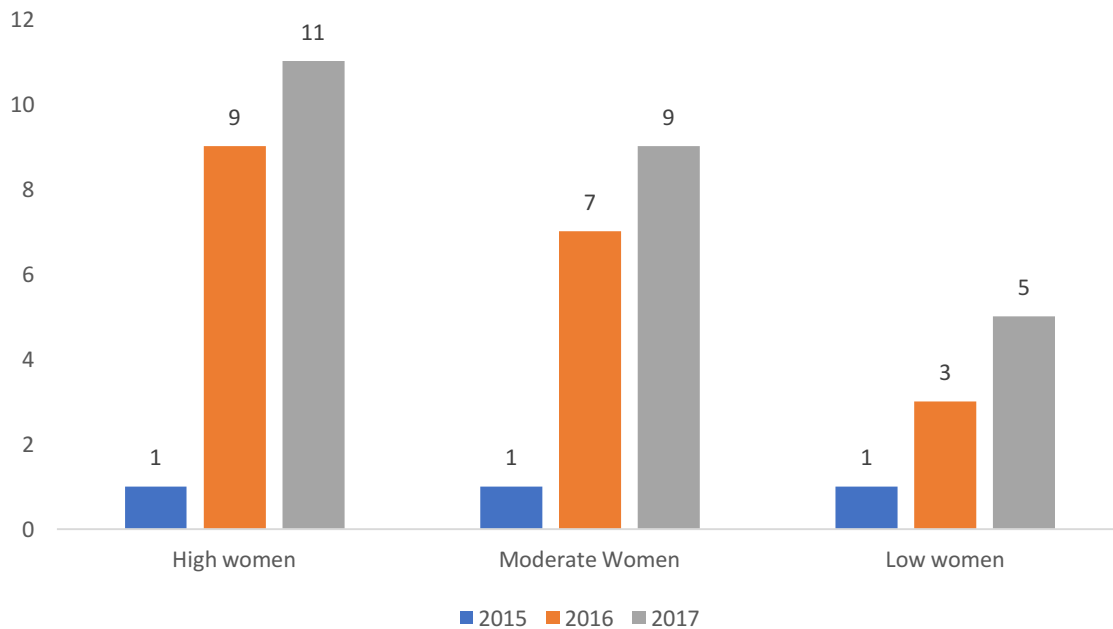
In Cote d’Ivoire, very few individuals in linked groups had individual accounts in 2015. By 2017, nearly 1 out of every 5 members had an account.

Chart 40: Percent of Linked Project Members with Individual Accounts Cote d'Ivoire



What is vital from a gender lens, is that the majority of these individual accounts are being opened by female members in both countries. This is true for both groups with high proportions of female members and moderate and low proportions of female members.

Chart 41: Count of Women with Accounts in typical group – both countries



High proportion of women = More than 85%; Moderate proportion of women = Between 70% and 85%; Low proportion of women = Less than 70% women.

Part 7: Bank Balances

The level of bank balances is a key indicator in assessing the linkage work of the POWER/Profir project. It is not enough simply to provide groups with access to a formal bank account. We need to know if they are using it.

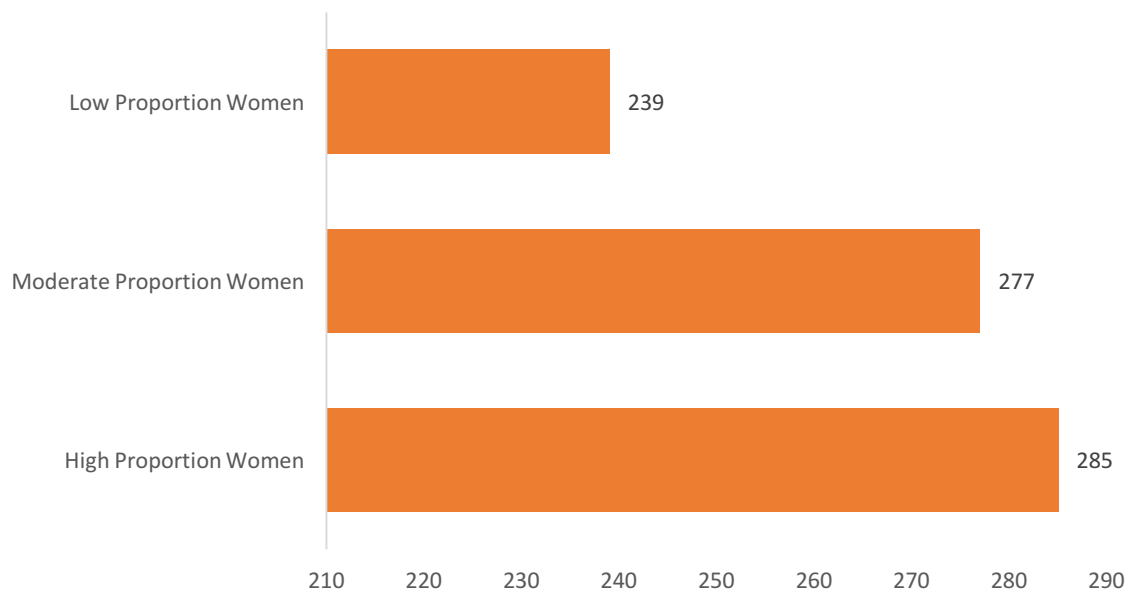
Once was to track this is to measure typical bank balances. In Rwanda, the average bank balance for 2016-2017 is 254,000 RWF. The median bank balance is 99 RWF. This very large difference is caused by a few groups having very large bank balances while many more groups having smaller balances. In Cote d'Ivoire, the average group bank account is 52,000 CFA and the median is 26,000 CFA.

The type of institution has a relationship with the typical bank balance in Rwanda. The average balance in group accounts with banks in Rwanda is 267,900 RWF. The average balance in group accounts with microfinance institutions is 127,600.

The bank balances are affected by the group characteristics in a similar way to the returns on savings and assets we analyzed above. In both Rwanda and Cote d'Ivoire, groups with higher proportions of women members have significantly higher bank balances. These differences are statistically significant, including when we control for the total amount of financial assets each group has.

In Rwanda, linked groups with over 70% women have an average bank balance that is 16% to 17% higher than groups with less than 70% women.

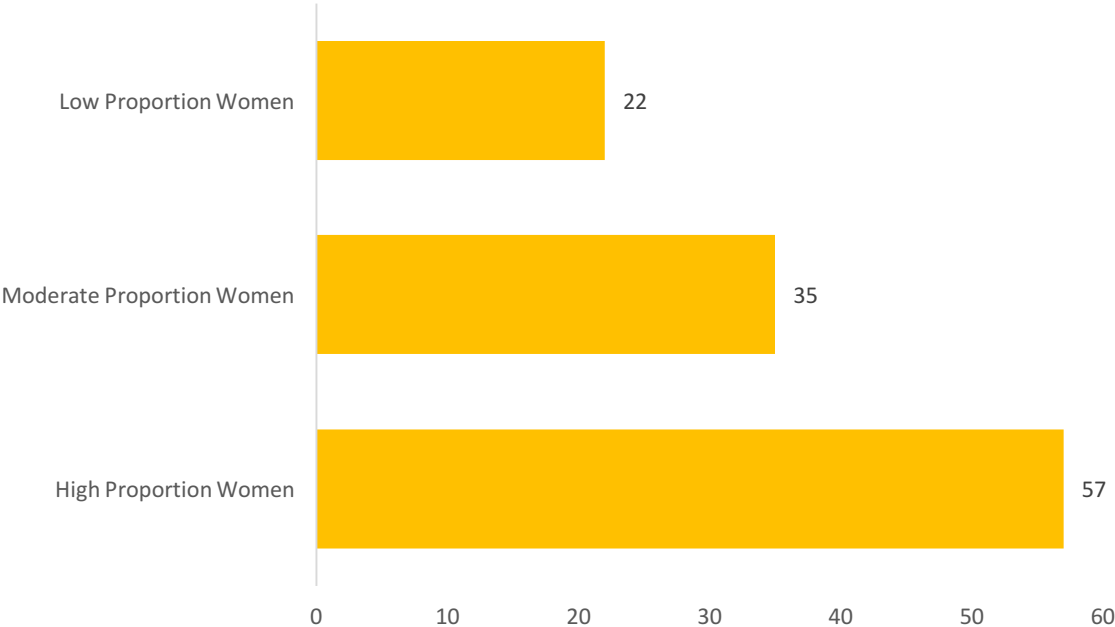
Chart 42: Average Bank Balance by Gender: Rwanda, RWF, thousands



High proportion of women = More than 85%; Moderate proportion of women = Between 70% and 85%; Low proportion of women = Less than 70% women.

In Cote d'Ivoire, the difference between groups with low proportions and high proportions of women is even greater. The average bank balance for linked groups with high proportions of women is 159% higher than groups with low proportions and 56% higher than groups with moderate proportions.

Chart 43: Average Bank Balance by Gender Cote d'Ivoire, CFA, thousands

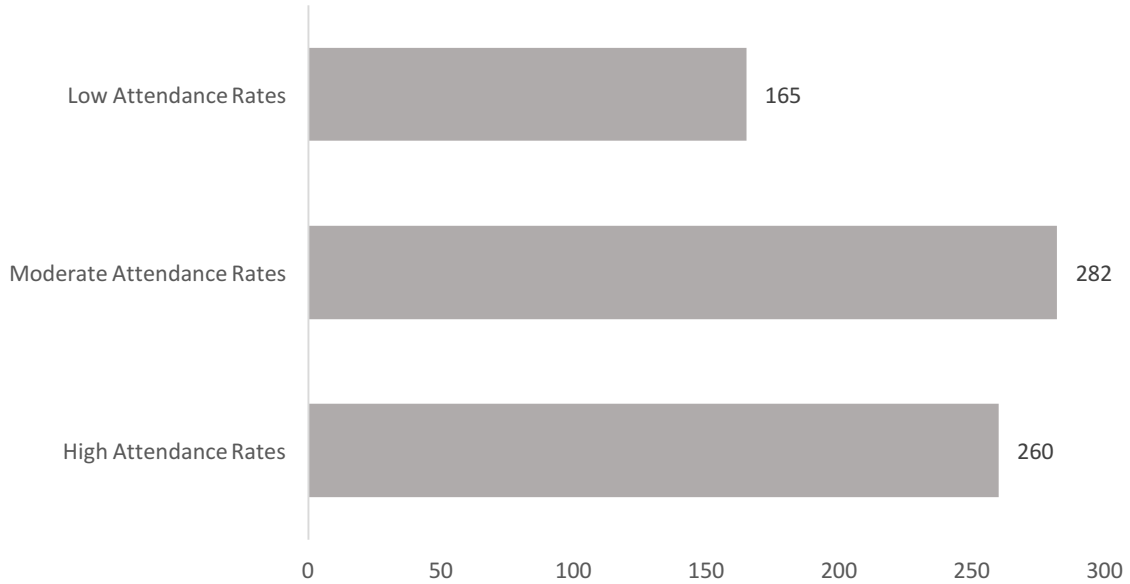


High proportion of women = More than 85%; Moderate proportion of women = Between 70% and 85%; Low proportion of women = Less than 70% women.

The differences in bank balances by attendance rates is also similar to the results we saw in our analysis of return on savings and assets. It is actually groups with moderate attendance rates who are performing the best.

In Rwanda, the bank balance of linked groups with moderate attendance group with is 8% higher than group with high attendance and 71% higher than groups with low attendance.

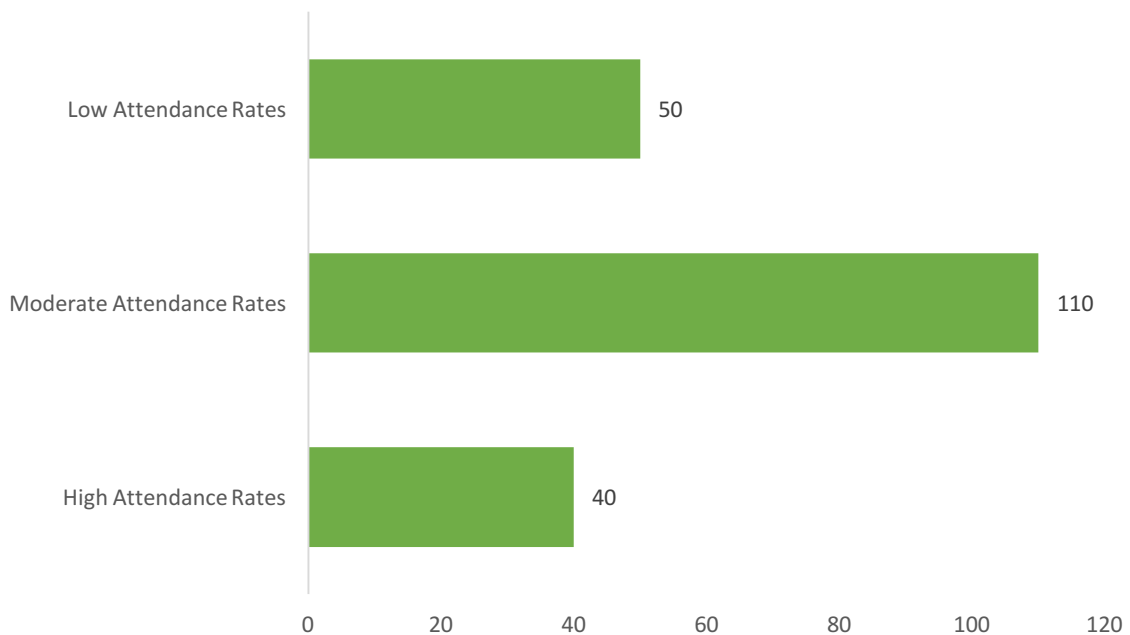
Chart 44: Average Bank Balance by Attendance Rwanda, RWF, thousands



High attendance rates = 98% and over; Moderate attendance rates = Between 85 and 97% average attendance rates; Low attendance rates = Less than 85% on average.

In Cote d'Ivoire, linked groups with both moderate and low attendance outperform groups with high attendance. The average bank balance of groups with moderate attendance is more than 120% higher than all other groups.

Chart 45: Average Bank Balance by Attendance Cote d'Ivoire, CFA, thousands



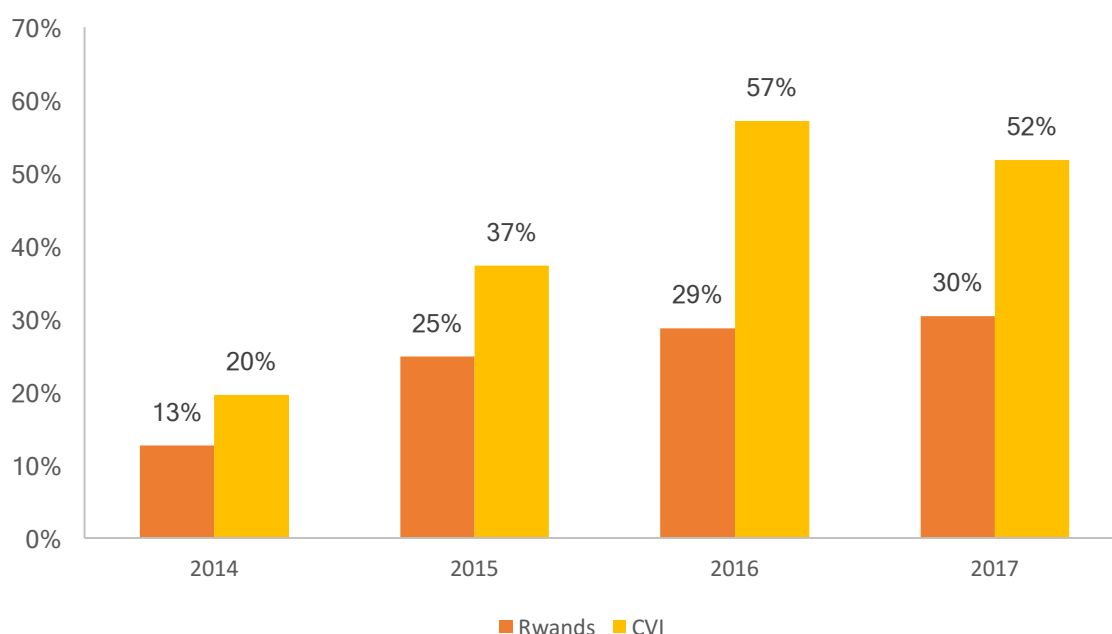
High attendance rates = 98% and over; Moderate attendance rates = Between 85 and 97% average attendance rates; Low attendance rates = Less than 85% on average.

Part 8: Percent of Total Savings in Bank

There have been regular and significant increases in the proportion of their total assets that linked groups hold in their bank accounts. These rates have risen in both countries the relative percent of holding in their bank account has grown much more rapidly in Cote d'Ivoire than in Rwanda. In Cote d'Ivoire, linked groups have over half of their savings in their bank accounts.

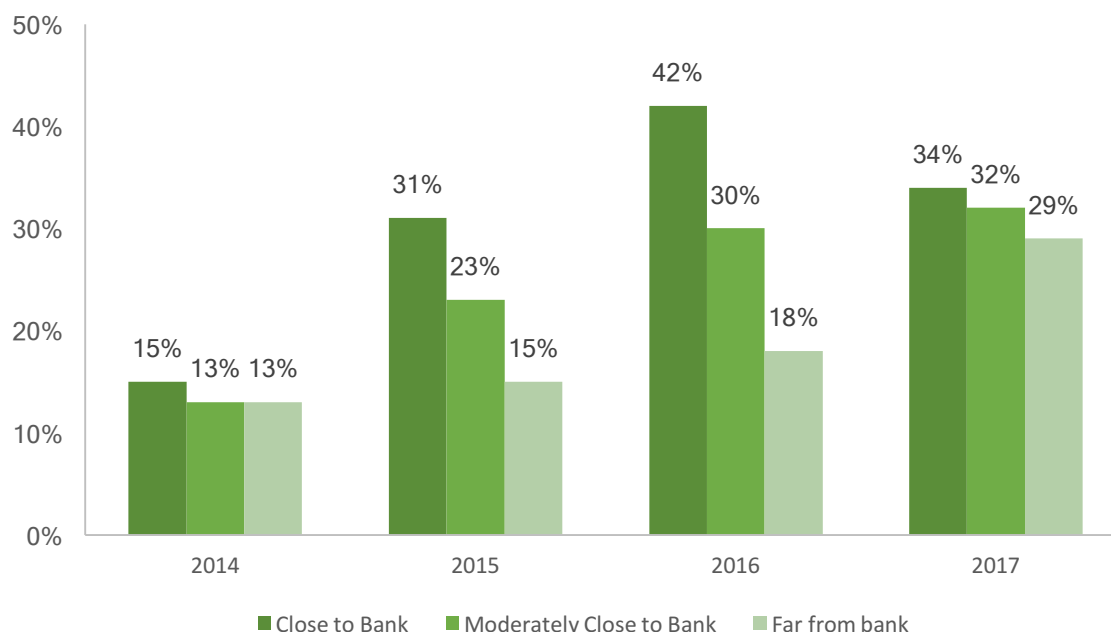
In Rwanda, the proportion of savings in bank accounts grew by 92 between 2014 and 2015. After 2016, the proportion seems to have leveled off to around 30%. In Cote d'Ivoire, the proportion of savings in banks grew by 85% between 2014 and 2015 and 54% between 2015 and 2016. However, this rate decreased by 9% in 2017, so we will watch this as further data are received.

Chart 46: Percent Group Savings in Bank



The group characteristic that is most predictive of how much of a group's assets are kept in the bank is proximity to the bank branch. This had a very strong influence over groups in the years 2015 and 2016 – with groups close to bank branched keeping almost a full 10% more in the bank. However, in 2017, these differences have started to lessen. This could be a change in group's understanding of how to use their accounts, or the introduction of more mobile money. This requires further exploration with more detailed data that may become available with the collection of the endline data.

Chart 47: Percent Total Group Savings in Bank by proximity to bank, both countries combined



Part 9: Financial Literacy Training

Financial Literacy Training

Training group members to use and understand formal financial tools is an important topic in projects involving linkages. Part of this analysis seeks to understand the effect of financial literacy training on members and groups who have the opportunity to open and use bank accounts and mobile money accounts.

Currently in Cote d'Ivoire approximately 68% of participants and 64% in Rwanda have received financial literacy training through the CARE POWER/Profir project.

The comparison of groups who have and have not received financial training shows that financial training leads to more active use of bank accounts as well as higher levels of bank balances being maintained.

Groups with Financial Training are 10% more likely to have active accounts. Groups with Financial training are usually having 17% more of their savings in their bank account.

However, there is a meaningful difference based on the combination of financial training and gender. Groups with financial training and high women are likely to have 34% more of their total savings in the bank than groups without financial training.

Conclusion

The savings and loans groups taking part in the POWER/PROFIR project have experienced many positive developments during their participation. Returns and savings per member increased regardless of whether the group was linked to a formal financial institution. This consistent progress represents successful maturation of the groups.

Nonetheless, linked groups far outperformed unlinked groups in every metric. In Rwanda, linked groups are earning a return on savings that is 57% higher than unlinked groups. In Cote d'Ivoire, linked groups are earning a ROS that is 85% higher than unlinked groups. Return on assets follows a similar trajectory.

When looking at the characteristics that further drive performance in linked groups, we see that group characteristics like the percent of women members, attendance, and financial literacy can make big differences in certain cases. For instance, among linked groups in Rwanda, groups with a high proportion of women have a return on savings that is 173% higher than groups with a low a proportion of women. For Cote d'Ivoire, the influence of women's participation is not quite as strong.

A similar trend is evident for attendance, linked groups with above 85% attendance in Rwanda had a return on assets that was double that of linked groups with less than 85% attendance. In Cote d'Ivoire, the return on assets does not vary widely by attendance among linked groups.

When looking at the success of linkage work via adoption and usage of individual bank accounts we see a large uptick in the number of linked group members opening a bank account. In 2014, only 19% of members in Rwanda and 3% of members in Cote d'Ivoire had a formal account. By 2017, this had grown to 42% for Rwanda and 19% for Cote d'Ivoire. Meanwhile, the proportion of savings the linked groups had in bank accounts grew from 13% to 30% in Rwanda and from 20% to 52% in Cote d'Ivoire. A majority of the bank accounts are opened by women.

These results show that POWER/PROFIR groups are making progress towards the goal of both financial inclusion and decreased gender gaps in access to and use of financial services. Furthermore, groups are able to leverage their link to formal financial institutions to increase their returns and savings.

Appendix A

The indicators Return on Savings and Return on Assets measure the increased yield groups gain from using their savings and assets during the course of their cycles. These calculations are based on the amount of savings a group has, the amount of loans a group has, and the amount of other debts and assets, such as property, that a group has. These amounts, and their relative value to each other, change from month to month within an individual group's cycle. At the beginning of the cycle, there are sometimes less savings and more loans and often near the end of the cycle there are more savings and less loans.

To calculate a Return on Savings and Return on Assets that can be compared across groups, we need to know what the group's savings amount, loan amount, and other debts and assets amounts are at comparable points in time. If all the groups of interest have submitted their data at the same point in their cycle – at share-out, for example, then it is possible to simply do the calculations of Profit/Loss, Return on Savings and Return on Assets directly to get comparable results. However, if the groups of interest have submitted their data at different points in their cycle this is not possible. One group may look like it is achieving very high Return on Savings simply because their data was submitted at a very early or very late point in their group cycle. If we want to calculate comparable metrics from groups whose data has been collected at different points in their cycle, we need to use an estimation algorithm that can take the data from the group, incorporate what we know about trends in relative savings and assets from many groups over time, and use these to calculate the standardized metrics.

The model to calculate these standardized metrics was developed by analyzing the trends of many groups over time. Data from over 11,000 savings groups was used to track the trends of how typical groups trends in savings, assets, debts and property rise and fall with each month of their cycle. These trends were then controlled for key group characteristics such as number of members, property at start, share-out, and gross amount of savings pre-cycle. These models were build using semi-parametric mixed-effects models. These are models that can incorporate curved trends, as financial trends usually are. As well, these models take into account the fact that groups data is being collected over time and groups exist within geographic clusters so that the error terms are not independent. This means that the model takes care of the fact that groups who are in similar parts of the country are more like each other than they are like groups from distant districts.

Once several versions of this model had been built, the Tibshurani method of post-selection inference was used to build a model selection process to find the most stable model across a wide variety of groups. The Tibshurani method is used to choose the best model among many choices. In these calculations, we have many choices of models due to the high number of variables combined with the high level of variation between groups. Some groups have a lot of savings with high rates of return while other groups have high savings with low rates of return, etc. Different models will fit different subgroups more accurately. We used the Tibshurani method to select the model that is optimal for the highest percentage of groups.

Once the model was chosen, the model was tested on simulated data that was based on the distributions found in the actual MIS data. The model tested to be accurate on over 87% of the cases. In the cases where the model was inaccurate, it was within 5 percentage points of the correct estimate 95% of the time. The model was also tested using a random sample of MIS data from the SAVIX database and was over 90% accurate on data from groups similar to POWER/Profir groups. This is a high level of accuracy in the given scenario of unbalanced data and a complex context. Once the model was confirmed, the POWER/Profir MIS data was used with the model to calculate the Standardized Return on Savings and Return on Investment for each group in the project as well as for the project portfolio as a whole.