Randomized Experiments in Microfinance

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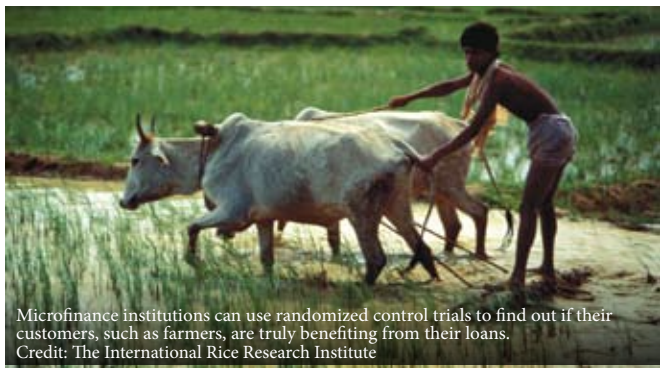
Randomized Experiments in Microfinance

Randomized experiments help practitioners, donors and academics evaluate the impact of microfinance interventions. The simple and adaptable methodology can accommodate variations to test different impacts. While randomized experiments have a unique ability to measure the impact of microfinance programs, they are not without challenges for the implementing institution. Jonathan Bauchet and Aparna Dalal from the Financial Access Initiative discuss the merits and limitations of randomized experiments for microfinance evaluations.



Microfinance institutions can use randomized control trials to find out if their customers, such as farmers, are truly benefiting from their loans.
Credit: The International Rice Research Institute

When medical researchers want to prove the effectiveness of a new cardiac medicine or nutrition protocol, they set up randomized trials. The idea is simple and clean. The researchers form a list of patients requiring treatment and randomly choose recipients of the new treatment and those who will receive the standard treatment. Random selection ensures that the new treatment is not diverted to the most promising patients, and the study can yield a reliable measure of efficacy.

The same approach is increasingly popular among evaluators of development interventions, including microfinance. Donors, academics and practitioners are turning to randomized experiments to address the fundamental challenge in impact evaluations - the need to clearly establish that the intervention caused the impact.

Imagine that we are a farmers' cooperative that wishes to measure the impact of a new loan product designed to help farmers buy fertilizer. We could compare the income of farmers before and after receiving the loan. But we would worry that changes in income might not be wholly attributable to the new loans. What if, say, the farmers experienced a good monsoon or if prices of their produce happened to rise? Surely these factors had an effect on their income. To assess the real impact of the loan, we would need to separate the effect of these environmental factors from that of the loan. Ideally, we would want to compare the farmer's actual income to what his income would have been had he not borrowed at all (the "counterfactual").

But this seems impossible. Our farmers did borrow, so how can we measure the counterfactual? A common approach is to compare the average income of farmers who received the fertilizer loan (the treatment group) to that of farmers who did not (the control group). The reasoning is that farmers in the control group are susceptible to the same environmental factors, hence their income is representative of our borrowing farmers had they not borrowed. This comparative technique works if the two groups were similar before the introduction of the loan. It would be unfair, for example, to compare the income of farmers who own large tracts of land to that of farmers who rent small patches, or the income of veteran farmers to that of inexperienced ones. In evaluation terms, we want to measure the unique impact of the fertilizer loan on income, net of the effect of land ownership, abilities and such other confounding factors.

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In microfinance, it is difficult to assume that the treatment and control groups are similar at the start of a program. Individuals who choose to borrow and are approved by an MFI are undoubtedly different from those who chose not to borrow or are denied credit. Borrowers and non-borrowers may differ based on observable characteristics like education, health and pre-loan income. They may also differ on unobservable characteristics like entrepreneurial ability or innate motivation. Failing to account for these characteristics could lead to overestimating or underestimating the impact of the loan. This error in attribution is called "selection bias." Fortunately, statistical techniques make it possible to isolate the confounding effect of measurable characteristics such as age or education. We have limited tools, however, to isolate the effect of unobservable characteristics such as motivation. Randomized trials can help us do so.

Eliminating Selection Bias

Randomized experiments solve the selection problem in a simple, yet powerful way. In a randomized experiment, the two groups (borrowers and non-borrowers) are selected at random. Hence, with a sufficiently large sample, one is certain that the two groups are similar in both observable and unobservable characteristics, since chance assigned individuals to each group. As a result, access to the intervention in question (e.g., being randomly chosen to get the new fertilizer loan) is the only systematic difference between groups, allowing us to conclude that it must be the cause of any difference in the average outcomes in each group.

The Mechanics

Implementing a randomized impact evaluation is a complex operation. In Figure 1, we provide a basic outline. As in the fertilizer loan example, the institution first identifies the intervention (program or product) they want to evaluate. This could be the fertilizer loan, a new savings device, a financial literacy program, etc. Randomized evaluations can also test variations in existing programs, such as marketing strategies, loan terms, interest rates and their impact on the take-up, repayment rates and profitability. As the second step, the lender identifies a set of potential clients for the loan. This set could consist of existing clients

of other products and/or potential new clients. Third, a baseline survey of these potential clients is conducted to measure characteristics that might influence the outcomes of interest. Fourth, some of the potential clients, usually 50%, are randomly selected to receive the new loan. The rest must wait until after the study to be eligible for the product. By offering the loan only to the treatment group, the lender is randomizing access to credit. If the lender wished to randomize the use of credit, he could offer the loan to the entire set of potential clients, and only randomly select who actually is assigned a loan from the group of individuals who applied. Randomizing access to credit or the use of credit matters for the lessons that can be drawn from the evaluation. Does the lender want the results to apply to all potential borrowers (access), or only to those who apply for the new loan product (use)? The fifth step is for the lender to perform the intervention, in this case to make the fertilizer loans. Last, after a period of time judged necessary for the loans to produce impact, the outcomes of interest are measured by conducting another survey of individuals in both the treatment and the control groups. At the core, the analysis involves nothing more than comparing the mean of the outcome in the treatment and control groups. More elaborate techniques are occasionally necessary, particularly when the evaluation includes complex randomization schemes or design elements. In all cases, the analysis must be done by comparing participants based on their initial assignment into the two groups, and not based on their actual participation, becausethe latter would reintroduce a selection bias.

The Decisions and Challenges

Institutions need to make a number of key decisions and face several challenges when designing and implementing such an experiment. The first decision pertains to the the sample size. While larger samples are more expensive and time consuming, they yield a more reliable measure of impact. This is referred to as the "power" of a study, and can be determined arithmetically. Second, institutions must consider the level of randomization. For instance, institutions can randomize at the group level (and not at the individual level) by assigning village banks, villages or other groups to selectively receive an intervention.

Figure 1. Five Steps in a Randomized Evaluation

1. Identify the intervention (fertilizer loan)
2. Identify potential clients
3. Conduct baseline survey
4. Randomize Treatment and Control
5. Perform the intervention (provide fertilizer loans)
6. Conduct follow-up survey (measure impacts)

Assuming all other design elements as fixed, group-level randomization requires a larger sample to maintain power. Third, institutions interested in using randomized impact evaluations must be willing to temporarily exclude clients from benefiting from its services. This could represent a departure from the institution's mission or strategy, and can sometimes raise ethical questions about who gets access to new products and services.

The greatest practical challenge in randomized experiments is to enforce the initial random assignment. Randomness is the source of our ability to claim that the intervention caused the observed outcomes. Three common threats to maintaining the randomness in participation are:

- Non-compliance: Members of a control group assigned not to receive a loan might obtain loans from other lenders, or members of a treatment group can change their mind and not borrow after all.
- Attrition: Individuals in the experiment may drop out of the program or move away so that surveyors can't measure the outcomes. If those that can't be surveyed did better (worse) than those who can, the impact of the loan will be underestimated (overestimated).
- Spillovers: Participants assigned to the treatment group might influence the outcomes of those in the control group, e.g., during a business training program, members from the treatment group might share insights from the training with neighbors in the control group.

These events can be mitigated with careful design and implementation. Non-compliance can be reduced by training bank staff carefully, and ensuring that they maintain the integrity of the groups. Attrition can be addressed by monitoring groups, and employing persistent surveyors. Spillovers are more difficult to deal with. One way to minimize this complication is to adjust the level of randomization. It may make sense to randomize larger groups into treatment or control bins rather than randomizing across individuals.

The Limitations

Randomized experiments are implemented by a specific organization in a particular setting, and therefore, provide limited support to generalizing the findings across other settings. The best way to overcome this limitation is to replicate the evaluations in various settings before drawing any major conclusion about the intervention.

Randomized experiments provide an estimate of the average impact of an intervention, but they do not tell us about the distribution of impacts. For example, if the fertilizer loan makes certain types of farmers much better off and all the others a little worse off, a randomized experiment (and most other evaluations) might yield the result that the average impact was positive if the positive impact is large enough to offset the sum of negative impacts. Sub-group analyses can be conducted to measure the impact for each type of farmer, but this exercise requires a sufficiently large sample in each sub-group.

As the debate on the impact of microfinance continues, randomized experiments serve as an effective tool to generate highly reliable information on the effect of programs and products. While they are demanding for its designers and implementers, they should be viewed as investments that help donors and policy makers channel resources and help institutions design better programs and products that can increase both their financial standing and social impacts. ■

Jonathan Bauchet and Aparna Dalal work at the Financial Access Initiative. Through consortium member Innovations for Poverty Action, FAI is supporting randomized experiments to evaluate the effect of microfinance interventions in fifteen countries. A complete list of projects and publications are available at www.financialaccess.org and www.poverty-action.org. To access a list of readings related to randomized trials, please see www.microfinanceinsights.com.