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The Lessons from DECRG-FP Impact Evaluations

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The eleventh in our series of impact notes profiles an innovative attempt to improve access to credit in Malawi through the use of biometric technology.

Using biometric technology in rural credit markets: The case of Malawi

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A **biometric** is a measure of identity based on a physiological (fingerprint, face, eye iris or retina) or behavioral (speech or signature) characteristic. It is an effective personal identifier because it is unique to and embodied in each person, so it cannot be forgotten, lost or stolen. Recent advancements in recognition technology coupled with increases in digital storage capacity and computer processing speed have made biometric technology increasingly feasible in a number of developing country settings.

One new application is in approving access to credit and insurance markets, especially in countries like Malawi without a unique identification system. In these places, identity fraud is rather common. Lenders tell anecdotes of past borrowers purposefully defaulting and trying to obtain a fresh loan from the same or another institution. The response of lenders has been to restrict the supply of such services.

Biometric technology can make the threat of future credit denial credible because it makes it easier for financial institutions to withhold new loans from past defaulters, and to reward responsible past borrowers with increased credit. As a result, individuals may take out smaller loans or avoid borrowing altogether; borrowers may have greater incentives to ensure that production is successful, either by exerting more effort or choosing less risky projects, and –whenever production could cover the loan repayment– may be less likely to default intentionally or opportunistically.

The Experiment

To look at the impact of biometric technology, we implemented a field experiment using smallholder paprika farmers that applied in 2007 for an agricultural input loan. Farmers in the study were randomly allocated to either a control group or to a treatment group where each member had a fingerprint collected as part of the loan application. Both treatment and control groups were given a training session on the importance of credit history in ensuring future access to credit.

Results

The study found that for the subgroup of farmers with the highest ex ante default risk, fingerprinting led to increases in the repayment rates of about 40 percent. By contrast, fingerprinting had no impact on repayment for farmers with low ex ante default risk. This higher repayment rates are due to fingerprinted borrowers requesting smaller loan sizes and devoting more land and other inputs to paprika.

Do you have a project you want evaluated? DECRG-FP researchers are always looking for opportunities to work with colleagues in the Bank and IFC. If you would like to ask our experts for advice or to collaborate on an evaluation, contact us care of the Impact editor, David McKenzie (dmckenzie@worldbank.org)

A rough cost-benefit analysis of the pilot experiment suggests that the benefits from improved repayment greatly outweigh the costs of equipment and fingerprint collection.

Challenges in the implementation of biometric systems

Despite the encouraging results from the pilot in Malawi and the success of biometric technology in controlled laboratory environments, there are still a few concerns and challenges when collecting and using such information in actual environments and when trying to establish an identification system at a national level.

- *Not everyone can be enrolled in a fingerprint-based identification system.* Fingerprints can be unrecognizable due to cuts or burns; older individuals may have poor fingerprints; and in some areas recovering from years of conflict, individuals may lack fingers altogether. In Malawi, only about 2 per cent of the sample of 1,600 fingerprinted farmers had the left thumbprint recorded, rather than the required right thumbprint because the scanner failed to capture it. These farmers grow tobacco which requires the heavy use of fingers in the transplanting of seedling. Over the years, their fingerprint ridges had become too worn to be captured.
- *The accuracy of biometric technology remains to a large extent untested.* Biometric companies report very high accuracy rates from highly controlled trials which typically use artificially generated data. However, because the performance of a technology depends greatly on the context, trials using real life data are far less impressive. For example, the UK Passport Service Trial reports that only 80 per cent of the cases could be correctly verified, younger individuals being more successful than older. In Malawi, everyone selected during demonstration sessions was correctly identified.
- *People may have a negative attitude towards providing their biometrics.* People may be reluctant to place their fingers on the scanners due to hygiene concerns; due to a perception that fingerprinting is linked to the criminal justice process; or for fear of persecution by authorities or others that gain illegal access to such biometric records. In Malawi, the authors did not encounter any resistance from the farmers, perhaps because it was a very novel technology.
- *The cost of collecting biometrics can be high in some cases*. The costs of using different types of biometric technology starting from basic fingerprinting techniques to voice and iris recognition software can be prohibitively expensive. In India there are legitimate concerns that the costs of rolling out biometric technology may mean a huge opportunity cost for the provision of social benefits for over 700 million Indians living in poverty.
- *Biometric technology is not infallible.* While biometric technology can be big step forward to combating issues of identity theft, fraud, and money-laundering efforts, it is essentially a technological application. As is the case with any other technology, it can be hacked, infiltrated, or runs the risk of having data fall into the wrong hands.

Despite these concerns, biometric technology presents an exciting and innovative opportunity for increased access to financial markets and better public service delivery. Whether it can be scaled up effectively and be used to resolving identification and authentication issues remains to be seen.

For further reading see:

X. Giné, J. Goldberg, and D. Yang, "Identification Strategy: A Field Experiment on Dynamic Incentives in Rural Credit Markets", World Bank, mimeo 2010

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