

How to Run an Impact Evaluation: An Example from Malawi



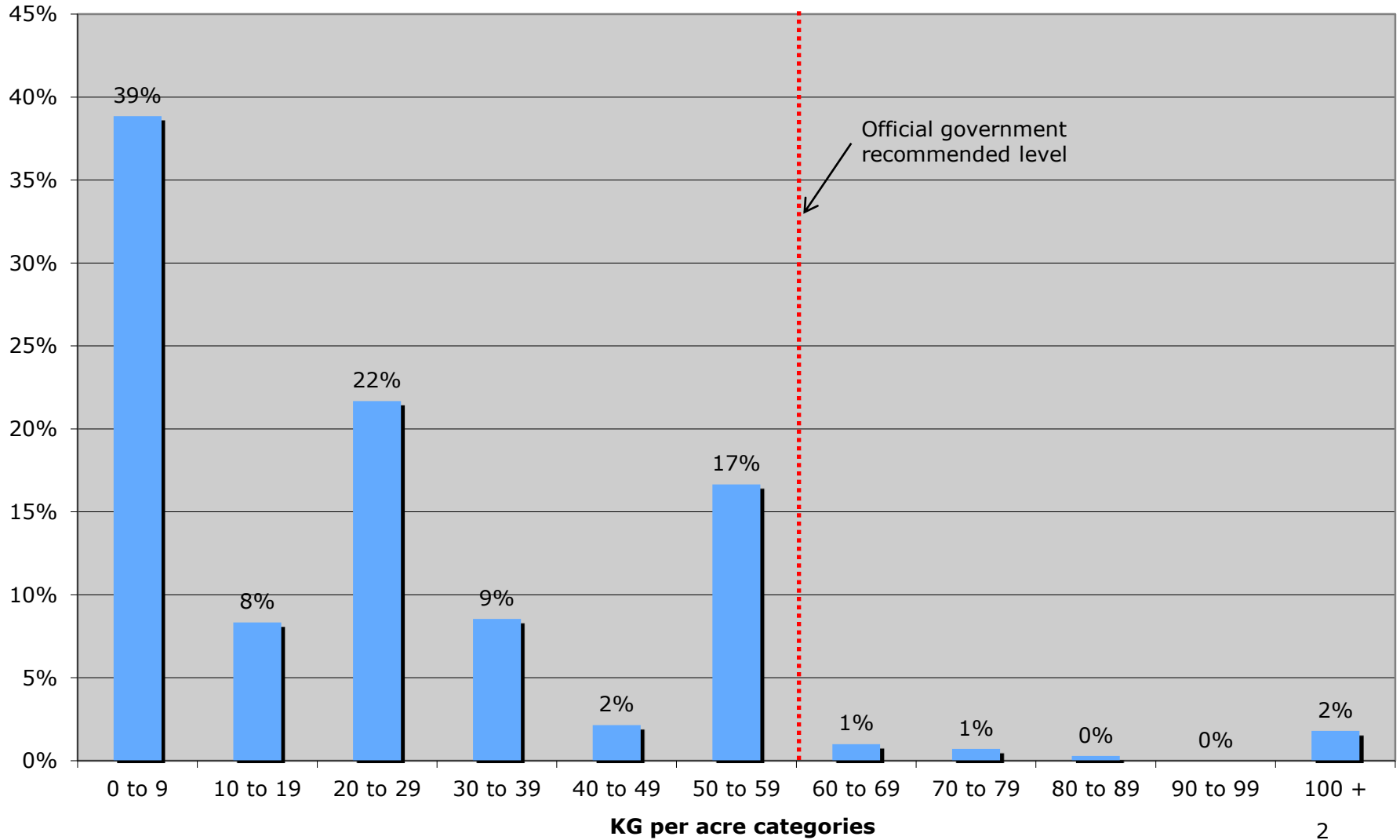
Dean Yang

*University of
Michigan*



Fertilizer use, cash crop farmers in central Malawi

Urea per Acre of Maize



Note: Per-acre fertilizer recommendation for central Malawi is ~60kg urea, ~40 kg 23:21 (per-hectare recommendation is 150 kg urea and 100 kg 23:21).

Raising farm output with rural finance

- **Insure** farmers against adverse events
 - Provide insurance against poor rainfall
- Facilitate **credit** for agricultural inputs
 - Improve repayment via biometric identification
- Encourage farmers to **save** for their own input purchases
 - Facilitate access to ordinary and “commitment” savings accounts

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Agenda

- Motivation – MRFC's perspective
- Intervention: fingerprinting
- Sample
- Randomized assignment to treatment
 - Choice of club-level randomization
- Data for analysis
 - Baseline survey
 - Follow-up survey
 - MRFC administrative data on loan repayment

Malawi Rural Finance Company

- Malawian microfinance institution
- One of most important providers of credit in rural areas
- Group-liability loans to rural entrepreneurs as well as farmers

MRFC loan officer

- Club visits for loan orientation and repayment collection carried out by MRFC loan officer on motorcycle



Repayment problems

- Serious repayment problems among farmers
 - Default rate often $>10\%$
- Among other factors, perception that many defaults are due to *imperfect personal identification*
 - MRFC can't tell if a person applying for a new loan has defaulted in the past
 - A borrower can take out a loan, default, and then apply for a new loan in future by using *a different name*
 - If MRFC could tell who had defaulted in past, would not lend to them in future
- Problem: no formal system to *identify* people
 - Loan officers can use their personal knowledge, but imperfect

Intervention

- To identify past defaulters, lenders in other countries use a variety of methods
 - E.g., national ID cards
- Approach used in our study with MRFC:
 - Collect *fingerprints* of farmers applying for a loan
 - Tell farmers that prior to all future loans, they will be fingerprinted again
 - Fingerprint will be used to look up individual's past repayment history
 - If they repay this loan on time, MRFC will be able to see that, and will approve next loan
 - If they default on this loan, MRFC can see that as well, and they will be denied future loans

Fingerprinting

- Aug-Sep 2007

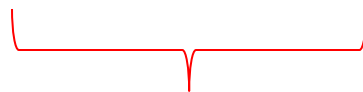


Demonstrating fingerprint identification



Our evaluation question

- What is the impact of fingerprinting on loan repayment?



intervention

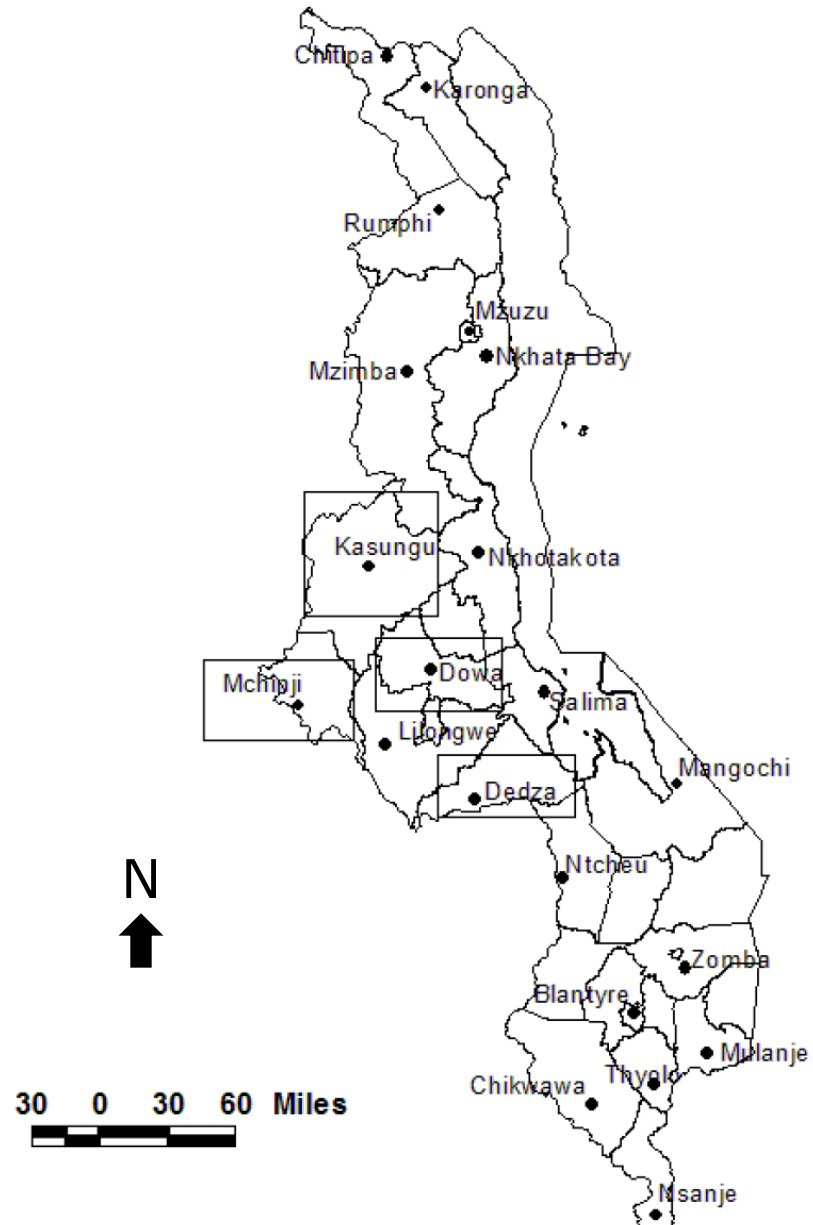


outcome

The loan program

- For paprika farmers in Central Malawi
- MRFC in-kind loans of ~MK17,000 (US\$120) for paprika farming inputs
- Cheetah Paprika provides extension services and purchases paprika output
 - Loan repayment forwarded to MRFC by Cheetah
 - Farmers paid remainder
- How can farmers “cheat” MRFC?
 - Take inputs, but don’t grow paprika
 - Sell inputs for cash value
 - Or sell paprika to other buyer, not to Cheetah

Malawi Study Areas



Young paprika in the field (Jan 2008)



A healthy paprika crop



Packing paprika for sale (May-Jun 2008)



Where did the sample come from?

- Cheetah Paprika provided us with list of farmers (and clubs) who had sold paprika to them in past in central Malawi
- MRFC agreed to consider all clubs for loans
- Study population:
 - 3,206 MRFC borrowers in central Malawi
 - In 214 farmer “clubs”

Paprika extension officer (plus our research manager)



A paprika club



Treatment and control groups

- Control farmers:
 - Educational module on credit history
- Treatment farmers:
 - Educational module on credit history (identical to module given to control group)
 - *plus*:
 - Biometric fingerprint collected from all farmers as part of loan application
 - Use of fingerprints for unique identification explained
 - Fingerprint identification demonstrated within group
- **Question:** Why give educational module to both groups?

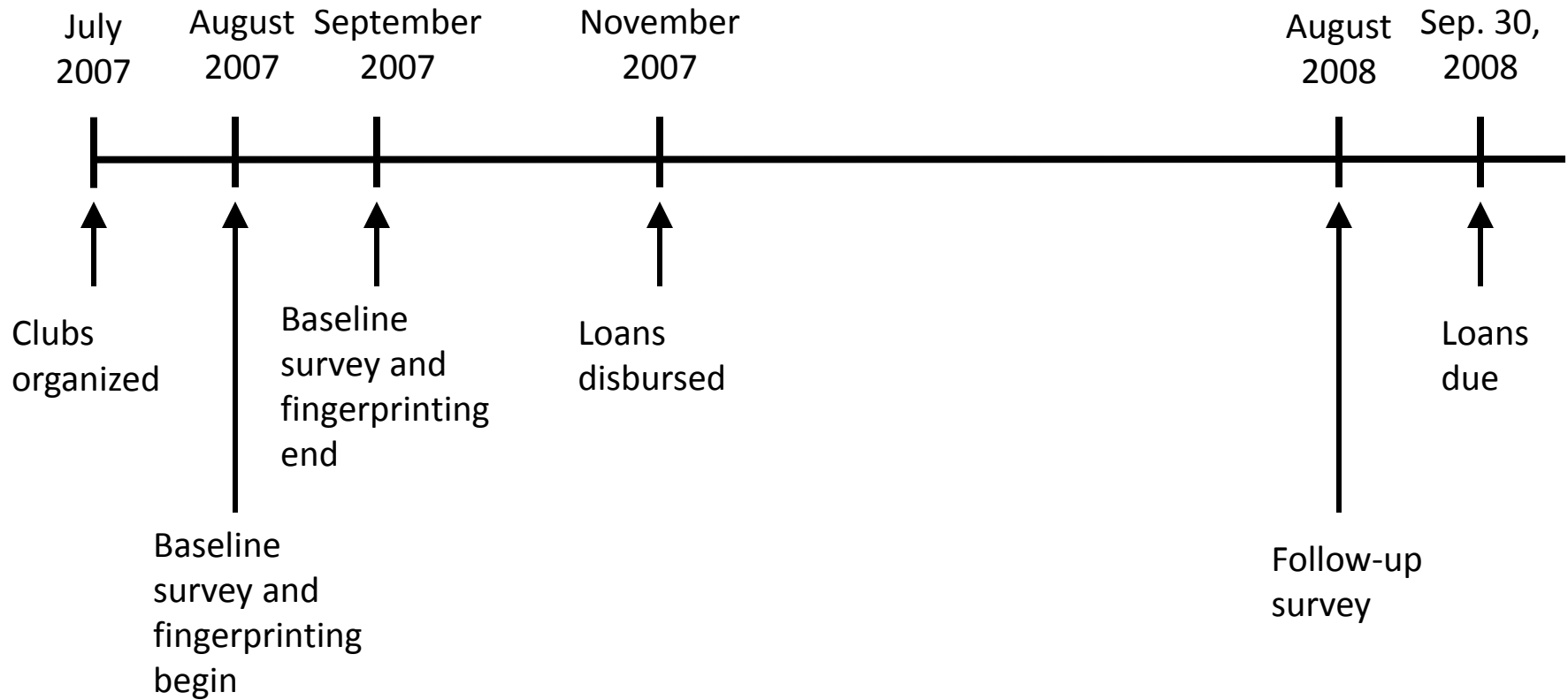
Randomization of treatment

- Key question in study design:
- At what level do we randomize treatment?
- First idea: randomize at *individual* level
 - **What are the pros and cons of randomizing at individual level?**

Group-level randomization

- We randomized at the level of the *farmer club*
- 214 clubs randomly assigned to treatment (fingerprinting) or control
- Rationale for doing this:
 - Farmers may be upset by knowing they were treated differently from others
 - And this may affect repayment
 - (Although not clear whether farmers would be more upset if they were fingerprinted or not...)
- Clubs are geographically spread out, so clubs were generally not aware that other clubs might have had different treatment

Study schedule

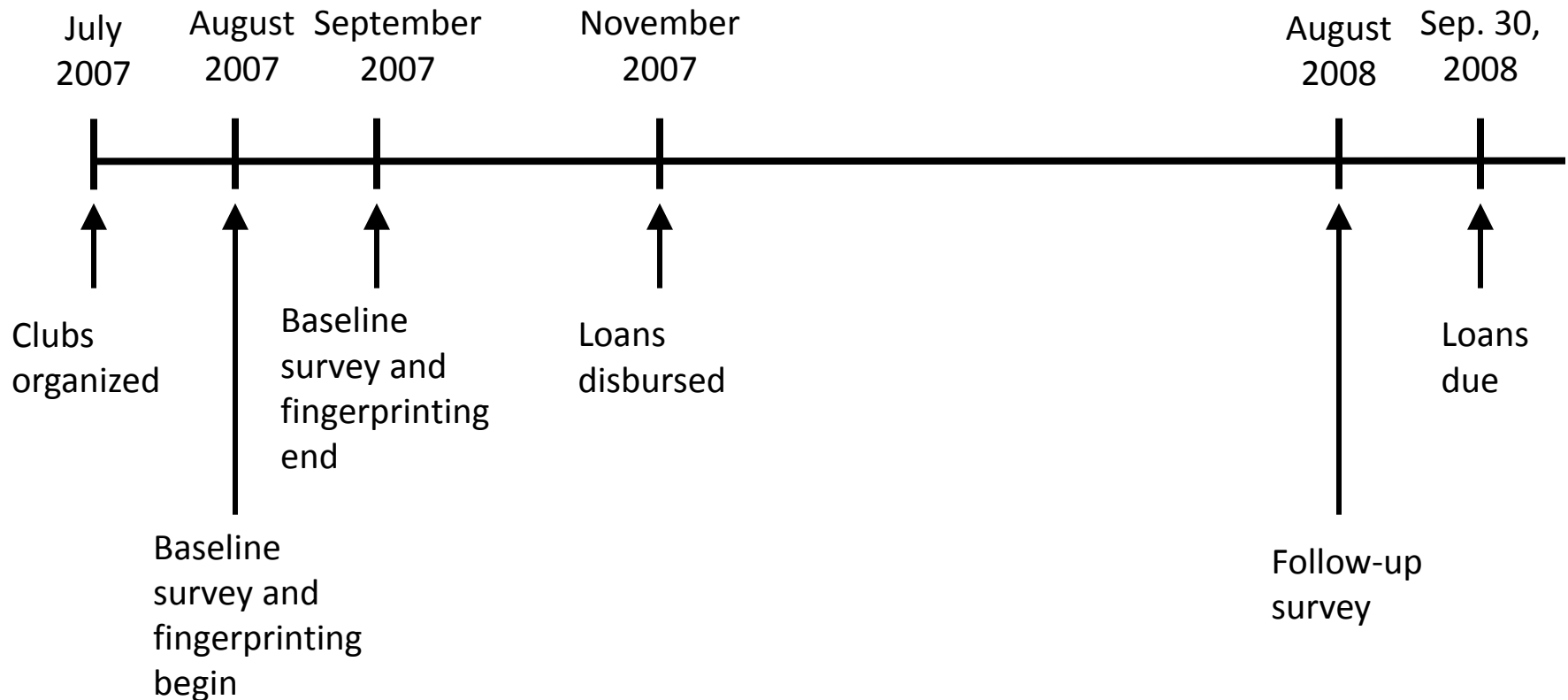


Baseline surveys (Aug–Sep 2007)



Study design incorporated from start

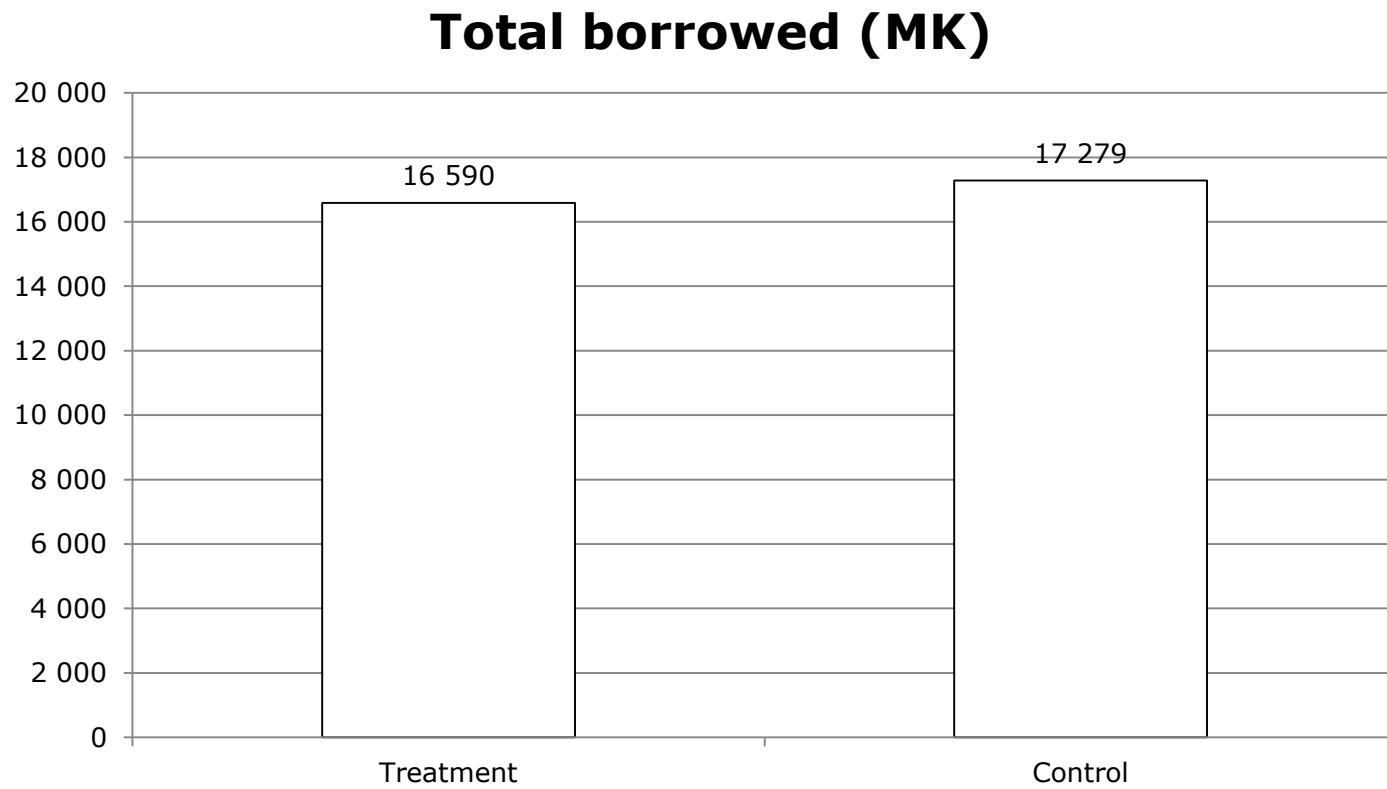
- **Question:** Why was it important that randomized evaluation was part of plan from the beginning?



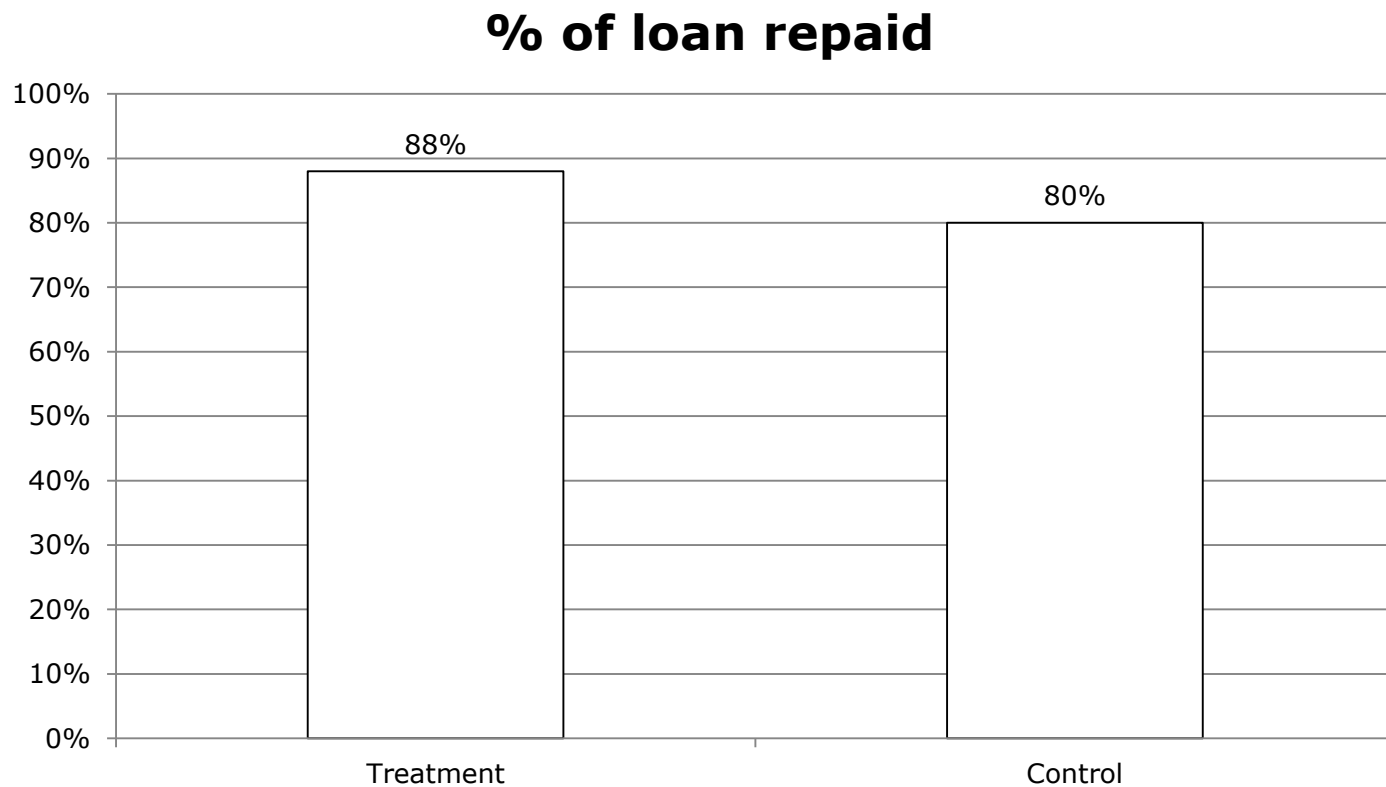
What were the impacts?

- Data for analysis:
 - Administrative data from MRFC on loan repayment
 - Follow-up survey
- In treatment and control groups, same percentage of farmers took out loans
- Other outcomes to compare between treatment and control:
 - Total borrowed
 - Repayment performance

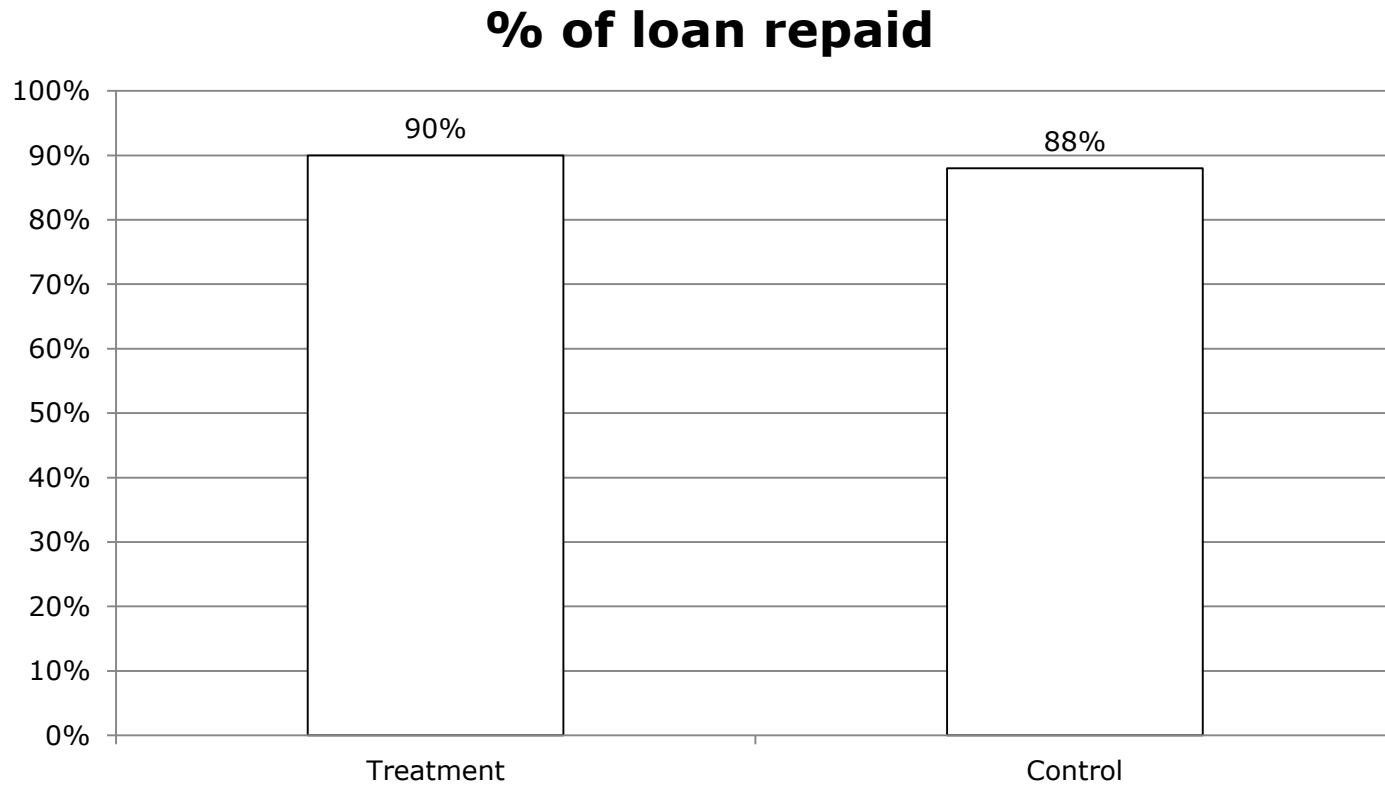
Total borrowed



Repayment rate (on-time)



Repayment rate (eventual)

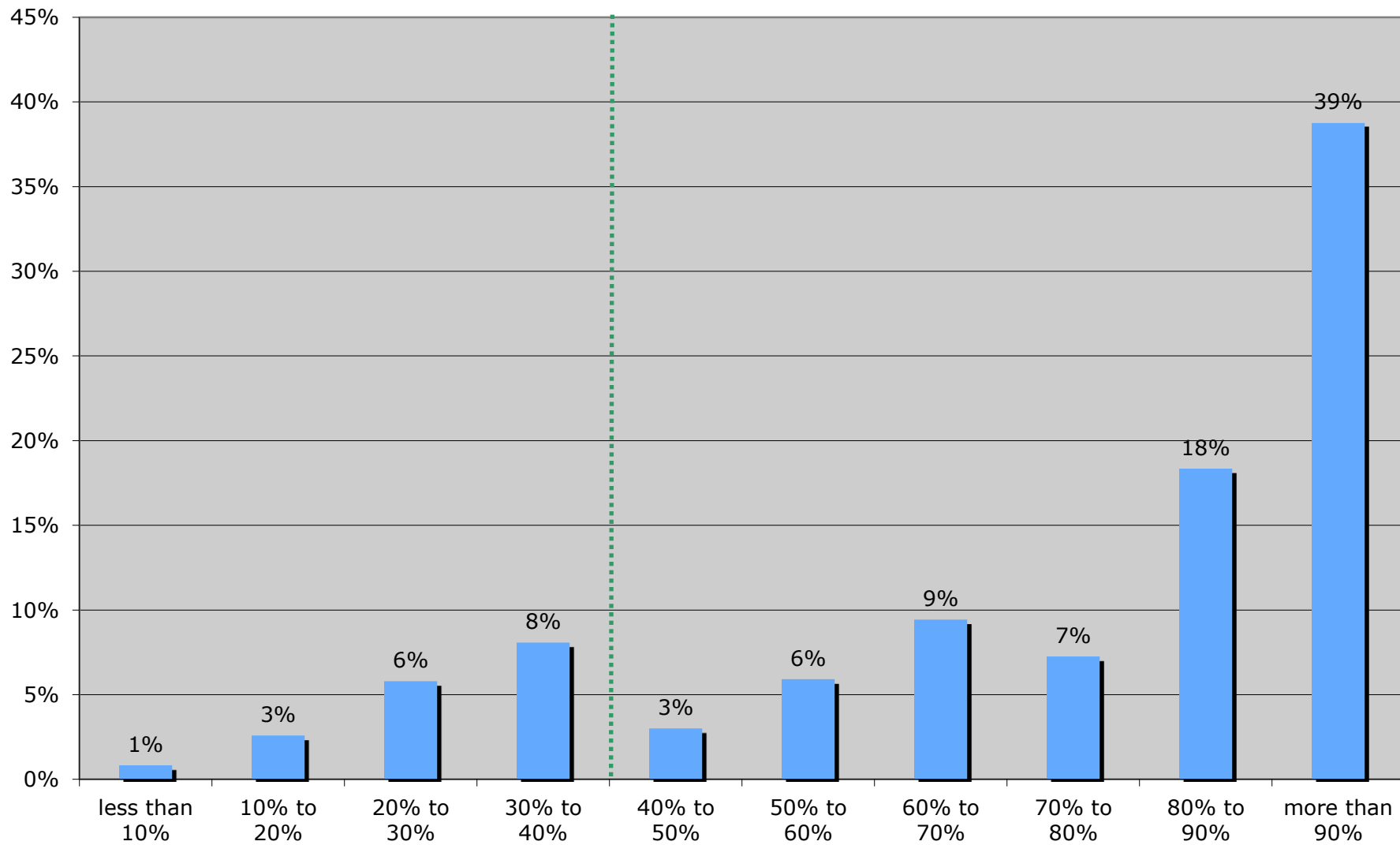


Are effects different for different types of borrowers?

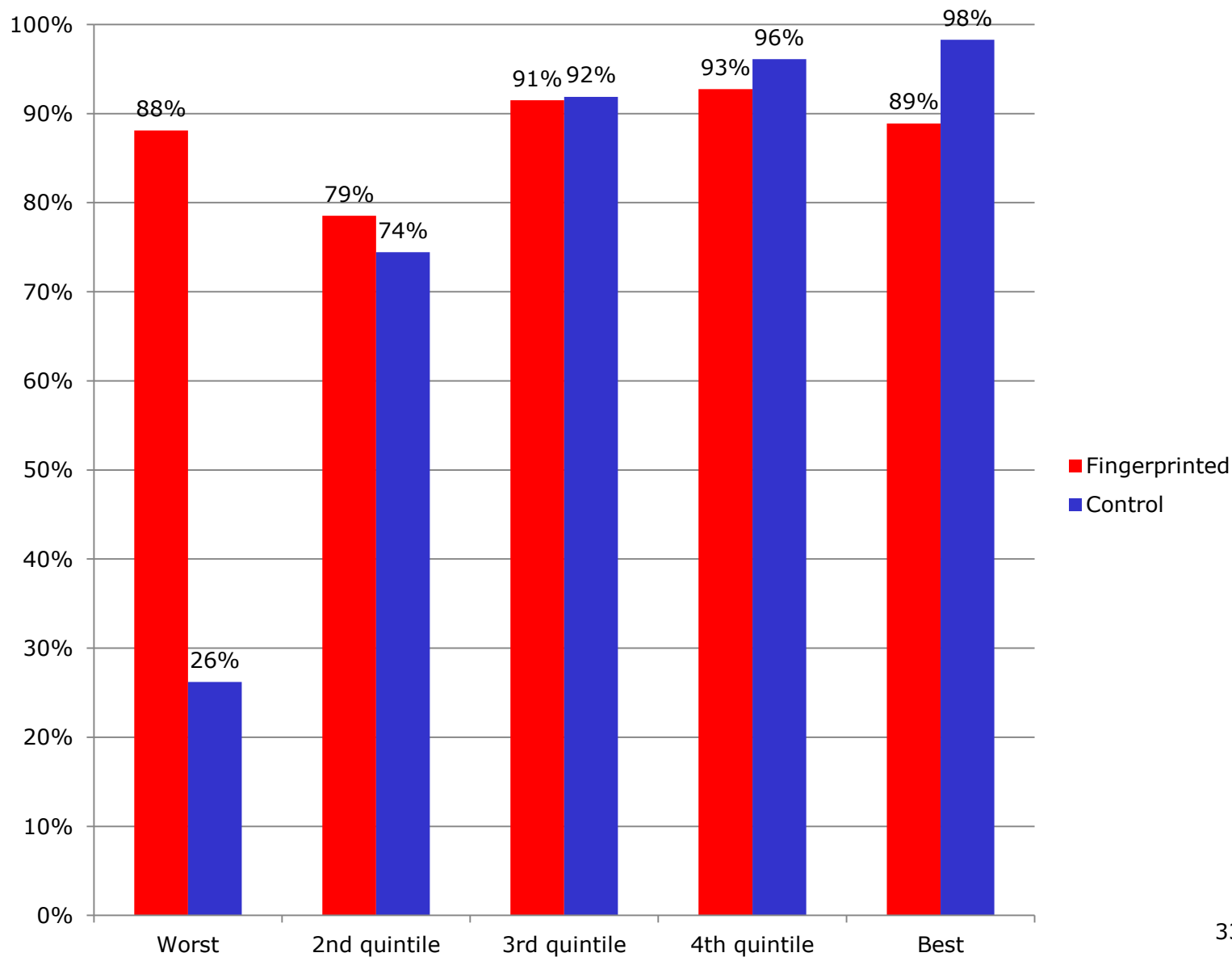
- Overall differences between treatment and control groups are relatively modest
- So next step in analysis: are effects different for different types of individuals?
- **Question:** What different types of individuals would you look at?
- What we did: look at different types of borrowers by *risk of default*
 - Calculate a “credit score” for each borrower
 - Examine treatment vs. control for borrowers in 5 different categories

Predicted percentage repaid ("credit score")

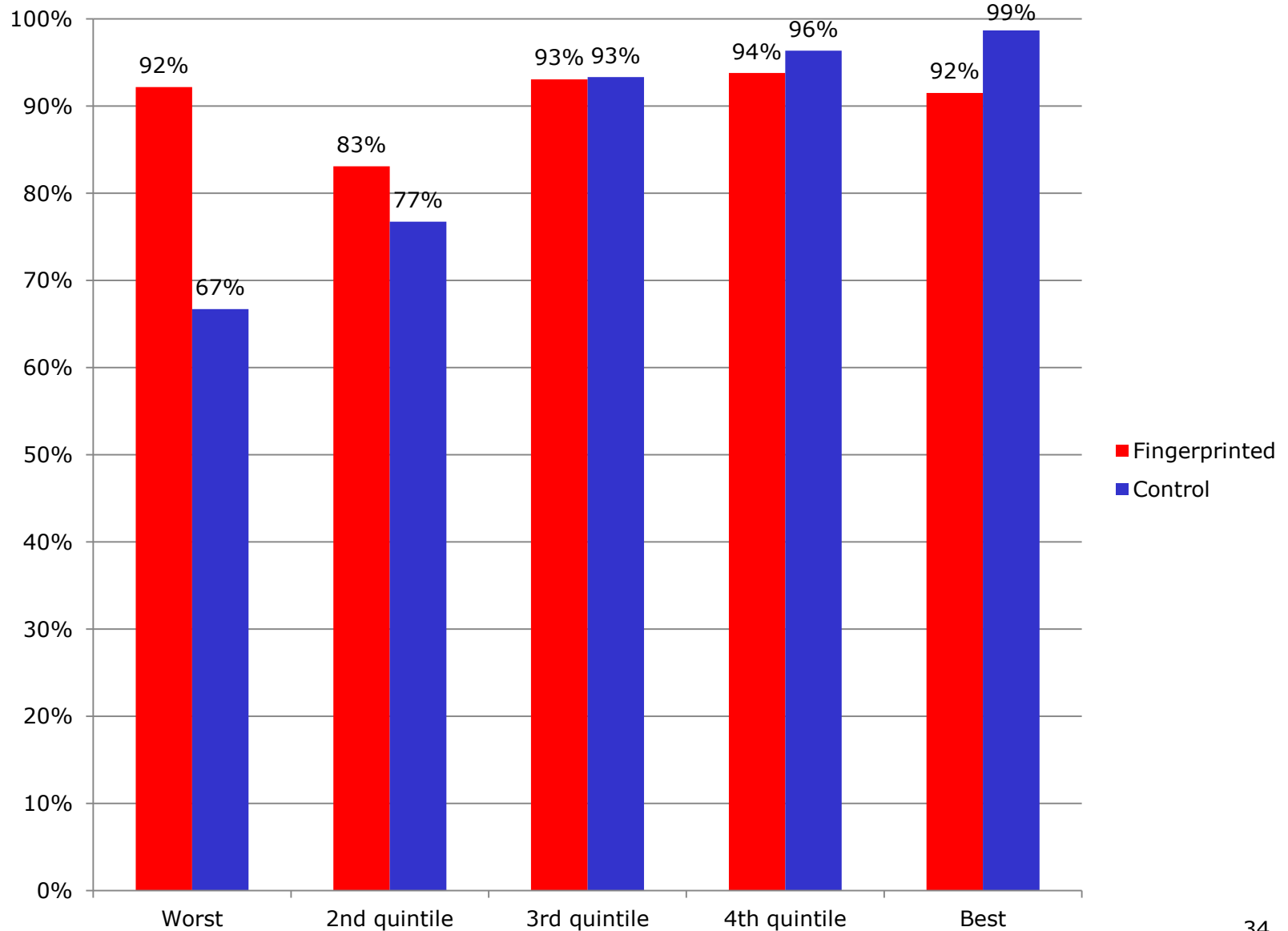
Predicted Repayment for Loan Recipients



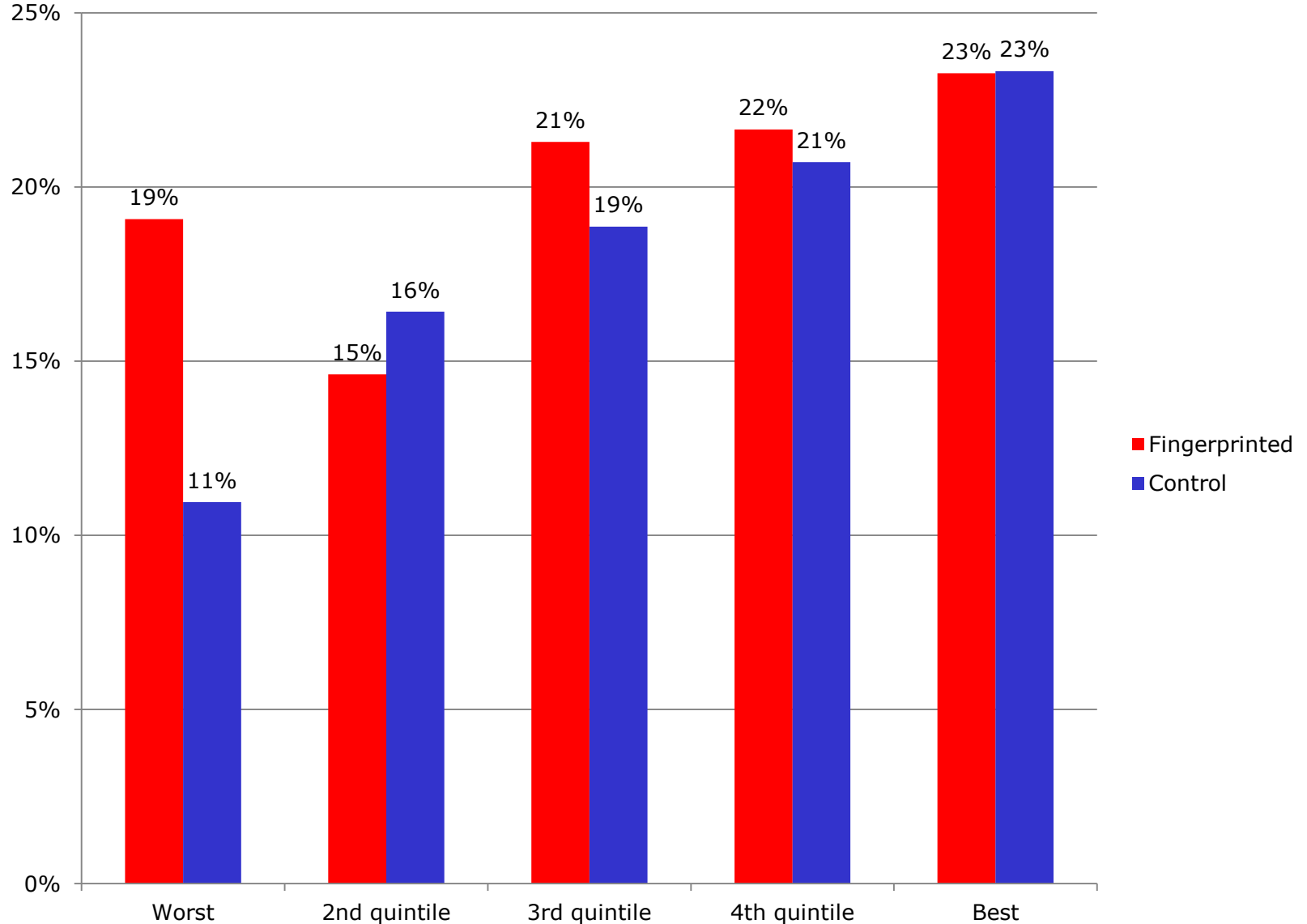
Repayment: % of balance paid on-time



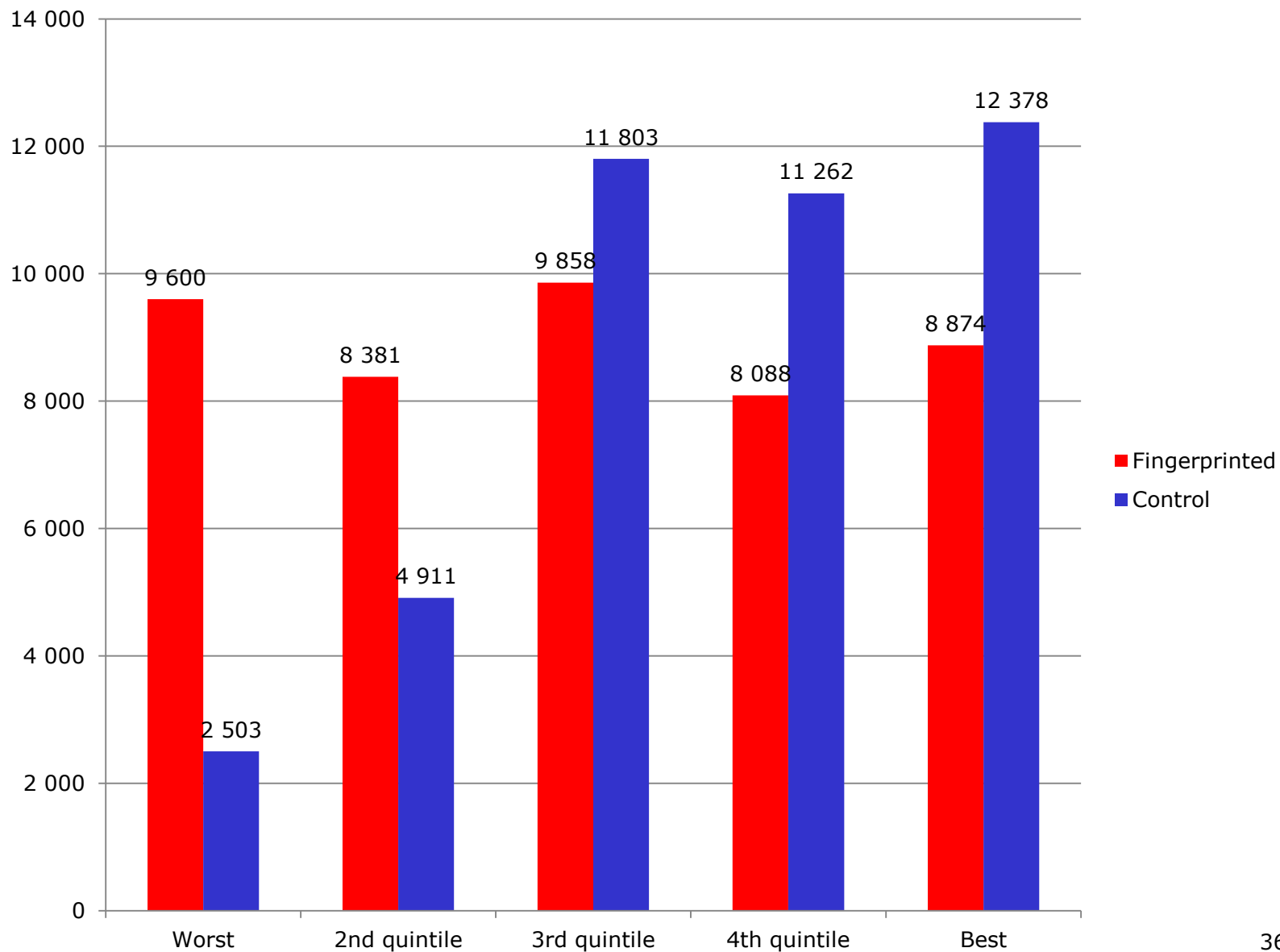
Repayment: % of balance paid (eventual)



Fraction of land allocated to paprika



Market inputs used on paprika (MK)



In sum

- A simple RCT in microfinance found a cheap and easy way to raise loan repayment performance
- Lessons for RCT design:
 - Randomization at group is feasible and avoids possible problems of individual-level randomization
 - Randomized study design needs to be built into program from the beginning