Randomized Evaluation
Start-to-finish

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Course Overview

1. What is Evaluation?
2. Outcomes, Impact, and Indicators
3. Why Randomize and Common Critiques
4. How to Randomize
5. Sampling and Sample Size
6. Threats and Analysis
7. Project from start to finish
8. Cost-Effectiveness Analysis and Scaling Up
Micro credit in rural Morocco

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The setting: Al Amana

- Al Amana is one of the largest Microfinance institution in Morocco
- Active loans 30,700
- Cumulated served loans 3,257,000
- Loans $ 232,440,000
- Large number of branches 464
The setting: Al Amana’s expansion to rural Morocco

• Mostly operated in urban areas up to 2006
• New policy started: expansion in rural Morocco
• An area where almost no financial services existed
• 10% have access to credit 6% through informal loans
The needs

• Many reasons for which people would like to borrow
  – Start / expand new business
  – Absorb chocks
  – Consumption durable/non durable

• Reduced borrowing possibilities

• People rely on informal loans or do not borrow
Intervention

• Al Amana opens a new branch in remote rural areas
  – Usually in a small town
  – Well identified nearby villages
  – Offer Al Amana microcredit products in the town and villages

• Loan officers visit villages, organize focus groups

• Al Amana microcredit product
  – Need an investment project
  – Not consumption loans
  – Need to have two activities

• Switch from group lending to individual lending during the experiment
Theory of change

- No access to financial services
- Households decisions about their activity are made in a constrained environment
- Supply of microcredit changes this environment by relaxing the constraint
- Many potential effects
Theory of change: investment

• Existing investment project not realized because of financial constraints
  – Take the microcredit
  – Do the investment
  – Reorganize household’s work effort
  – Change in production, resources
  – Repay the loan
  – Change in savings and consumption
    • Can be different in the short run and the long run
Theory of change: side effects

• What about the quality of the initial project
  – Problems in loan repayments
  – Negative effect on consumption or savings

• What about education decision
  – Potential long term negative effect if reduced school attendance: such an effect found in the Bosnia study

• Woman empowerment
  – Business started by women who get therefore their own money and autonomy
Theory of change: what is the motivation for investment?

- Common view is that poor people are all potential talented entrepreneurs
  - They have the desire and the skills to run entrepreneurship projects
  - Investment projects are entrepreneurship projects to make business and to earn money

- But poor people in rural Morocco also have a painful work
  - Large share of work done outside as daily laborers
  - Purpose might not be to make business but to reduce the share of outside painful work
Theory of change: insurance

• A substitute to insurance: no insurance products available

• Shocks: economic lives in rural villages subject to large shocks:
  – 14% lost more than half the harvest or livestock in the preceding year

• Absorption of these shocks frequently implies to take on household’s assets
  – Either monetary or physical assets

• Microcredit is a way to accommodate these shocks
  – Taking a microcredit in case of a shock allows to keep household’s asset
Theory of change: inter-temporal constraints removed

• Current decisions can be taken with in mind the knowledge that financial constraints may occur in the future
• Even if people do not take a credit now the environment in which they take their decision has changed
• Potential effect also on non takers
Why Evaluate?

• Strong debates surrounding the impact of microfinance
  – For some the silver bullet to fight poverty
  – For others a path to over-indebtedness

• Need evidence-based study
Why Evaluate?

• Almost no knowledge about microcredit effect
• Strong selection effect
  – Individuals self select into microfinance programs
  – Microfinance institutions select also individuals
• Difficult to find suitable empirical strategies to deal with selection biases
  – Some attempts using non RCT methods but not convincing
• Large value added by RCTs
Why Evaluate?

• Several RCTs launched at almost the same moment:
  – India (Banerjee & al, 2013),
  – Mexico (Angelucci et al, 2013)
  – Bosnia (Augsburg et al. 2013)
  – Ethiopia (Tarrozzi et al. 2013)

• Mostly in urban areas

• These studies take place in areas where there exists several alternative borrowing possibilities
  – Interventions made cheaper credit more easily available
Why Evaluate?

• No knowledge about how people adapt their decisions and working life when the financial constraint is relaxed
• The setting here is unique
• Compare
  – A world without financial services
  – With a word in which these services are made available
Design: operational constraints

- In 2006 Al Amana decided to expand progressively in remote rural areas.
- Progressive move.
- Process is to have several new branches located in a small town.
  - Serving the town and well identified nearby villages.
Design: operational constraints

- Al Amana Progression in waves
- Schedule was to have a first wave in March 2006 with 10 new branches
- One additional wave in July 2006 with 30 branches
- One last wave in October 2006 with 40 branches
Design: idea

- For each new branch select a pair of villages within the set of villages served by the new branch
- Randomly assign one village of the pair to be a treatment village:
  - microcredit is offered
- The second village of the pair is the control village
  - The offer of microcredit services is postponed for two years
Design: making the idea concrete

• How to select the villages
• They have to be close to the border of the area served by the new branch
  – Get a map of the area with roads and villages and identify potential villages
• They have to be quite similar
  – Do a survey to collect all suitable information: size, activity, # farmers, wealth,…
  – Match the potential villages
Design: selection of villages

- Zone A
- Zone centrale
- Zone B
Design: an encouragement design

• All the households will not become micro clients of Al Amana
• Some will, but some others not
• We followed randomly selected people in treatment and control villages
• Do that independently from the fact that they are or not client
Design: an encouragement design

- This is for one pair
- We have many pairs
- Clustered experiment: we need lots of clusters
- Follow everybody randomly selected in T and C villages
ITT or TOT?

• Imperfect compliance: we can look at two types of parameters
  – Impact on households in treatment village: ITT (Means we look at the impact of making microcredit available)
  – Impact on those who became clients: impact of taking a microcredit TOT

• Recovering ITT is easy: difference between mean outcome in treatment and control villages

• Recovering TOT is more complicated. Need assumption that those who were not client have not been affected

• Only consider ITT here
Design: schedule

- Get the map of the area
- Make surveys at the village level
- Match villages and select a pair
- Select households in the village and make the baseline survey
- Randomly assign within pair villages to be treatment or control
Design: Power calculation

• Two questions:
  – How many people do we need to follow in each village
  – How many pairs of villages

• Two important unknown parameters
  – Correlation intra village: villages from a same pair share a lot in common
  – Micro credit take-up: real unknown parameter
  – Use a guess value based on what the microfinance institution was expecting: 70%
Design: Power calculation

- We are doing a test with alpha=0.05
- **We want to detect a standardized effect of 20%**
- We want a power of 80%
- Rho was chosen low 0.05
- Take-up assumed to be 70%
- Choose to survey 25 households in average at the village level
Design: Power calculation

- Run optimal design
- Get the number of pairs of villages

81 pairs
162 villages

- An order of magnitude to keep in mind
- Risk: No real knowledge about the take-up
- Power strongly sensitive to take-up
Répartition géographique des points de vente d’Al Amana
Identify key players

• Top management at Al Amana
  – Fouad Abdelmouni head of Al Amana
  – Strongly support the research

• Other people working in Rabat. We mainly had to work with them
  – Al Amana a large institution with already bureaucratic procedures
  – Not a 100% responsive environment but however things went well
Identify key players: field staff

- Key they understand the experiment
  - Need to go very often in the field to monitor and listen
  - Check they understand what they have to do
    - Getting the maps was not easy: they didn’t know the area
    - They just started a new activity with 100’s of things to do
    - Experiment was just an additional thing, a bit weird

- No strong incentives to go to the treatment villages
  - Remote villages
  - Take sometimes one day to go
    - Obtain from Al Amana they get reimbursed for travel expenses and they have financial interest in having loans in treatment villages
Identify key player: funder

- The study was financed by AFD
- The agency in charge of development programs in France
- They have a large field experience
- Important to have them involved all along the process
Measurement

• Two large surveys conducted
  – Baseline and endline surveys, 2 years after
  – Very important to have a baseline: need to show that the sample is balanced

• The survey lasted almost 2 hours

• Based on existing household questionnaire used by many institutions

• Large set of information
Measurement: Intermediate outcomes

• Lending: we want to know whether offering microcredit indeed made a change in the amount household borrowed
• We want to know if the amount borrowed from various sources
  – Informal, formal, formal IMF
• We want to know also the repayment burden
Measurement: Final outcomes

- Activity: very detailed information, know the production of cherries, figs, olives, carrots... same for livestock, same for business
- Know detail of activities at a very detailed level
- Know also the amount self consumed, the amount sold, the amount stored
- Know by activity all expenses at a very detailed level
  - Wages, input
- Know also the investment
- Know productive assets owned by the household
Measurement: Final outcomes

- Know each household member labor effort inside and outside the household
- Know if young people attend school
- Know the consumption of very detailed consumption items
- Get information about women autonomy
Measurement: Attrition

- We identified household at the baseline survey
- We then follow them two years later
- Some of the households were no longer in the village
- Attrition measure the share of households for which the endline survey was not passed
  - The average is 8%
- Differential attrition compare attrition rates between treatment and control
  - 7% in the treatment - 9% in the control
  - Small differential. Ignore it
Measurement: Implementation

- First RCT we did in Morocco
- Difficult to implement surveys
- Administrative procedure to access villages
- Need to get the authorization from local authorities
- Ask a private firm to do the job
  - Lots of problems however
- For the RCT we have since been conducting in Morocco we preferred to organize our own enumerator teams
Planning

• Al Amana progress in rural areas

• Schedule and reality
  – Initially planned to have three waves in March, July, October 2006
  – In the end four waves in March, October 2006, February and July 2007
  – 10 months delay: not bad in fact for such an organization!
Timing

• Al Amana send us the list of new branches
• New branches are created and a loan officer comes there
• Draw a rough map of the area, with villages and roads. Town is served but no villages
• Identify a list of potential villages
• Send the private firm to survey the villages
• Choose the pair
• Tell Al Amana to serve all villages but the pair
Timing

• Ask the private firm to do the surveys in the pair of villages
• Draw the treatment and control within pair
• Tell Al Amana which is the control
• Al Amana goes intensively in the treatment village to serve microcredit products
Result: loans

- Almost no credit available in control group
- Offering microcredit lead to a substantial increase in loans
- Al Amana clients: +16.7%
- Loans (from the survey): +9%

- Good but... far from what was expected: 70%
- Power at risk
Results: loans

• Large increase in borrowed amounts from Alamana
• Compute the difference between treatment and control villages
• **ITT estimate:** 793 Dhs***
• Mean that the additional amount for clients is $\frac{793}{0.163}=4865$ Dhs
• **Only look at ITT difference**, but keep in mind that only a small fraction get additional funding
  – Small take-up reduces apparent magnitude of effects
Results: loans

• Total amount borrowed by the household
  – IMF + all other channels

• Control mean 1,882: impact 1,193***
  (Mean in treatment group is 1,882+1,193)

• No substitution with other existing channels
• Real increase in available financial resources
Substantial increase in activity

- Asset 15,982 control: impact 1,454**
- Sales+Self-consumption 39,450 control: impact 6,090***
- Expenditures 21,394 control: impact 4,079**
- Profit 4,934 control: impact 2,011*
Are these numbers large?

- This is ITT
- TOT effect would be obtained dividing by take-up. Here for production:
  \[
  \frac{6,090}{0.16} = 38,062 (=96\% \text{ of control mean})
  \]
- Also compare to increase in available funds (1,193)
  \[
  \frac{2,011}{1,193} = 1.70
  \]

Contrast between the low take-up and the large impact!
Substitution among income sources

- Total income 27,670 control : impact 447ns
- Income from self activities 9,056 control: impact 2,011*
- Income daily labor 15,748 control: impact -1,052 **
- Sales of assets 709  control: impact -679**
Substitution among income sources

- Main effect is to do a substitution between income sources
- Households have members working as daily laborers
- They shift their activity from daily labor to self employment
Partial substitution in hours of work

- # hours of work per member per week
- Total 27.5 control: impact -0.6ns
- Household activity 9.0 control: impact 0.2
- Outside 6.5 control: impact -0.6**
- Chores 12.0 control: impact -0.3*

- Purpose is to re-alocate working hours partially to self employment activity
- Also a reduction ns in total hours
Consumption

- Do not see large effect on consumption
- A small ns reduction of total consumption
- Located in some specific items (social events)
Conclusion

• Not a huge effect of microcredit supply

• Far from ideas that take-up will be very high and households will all become entrepreneurs

• However large contrast with impact on beneficiaries
  – Huge impact on activity

• Why a so small demand!
Conclusion

• Another striking result:
  – Room to increase labor
  – But no increase in labor

• Mainly substitution of inside labor to outside labor
  – Improvement of utility do not come from increase in resources?

• About to get data for an additional survey 5 years after randomization