Empirical Financial Economics: Part 2

Simon Naitram[1]

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[1]University of the West Indies, simon.naitram@cavehill.uwi.edu

Tonight's Lecture

- An introduction to microfinance
- A model of lending
- The mechanics of microfinance
- Randomised control trials
- An application to Hyderabad
- Pooling RCTs for external validity
- Funding microfinance
- The Caribbean

Required Reading

- Banerjee, A.V., 2013. Microcredit under the microscope: what have we learned in the past two decades, and what do we need to know?. Annu. Rev. Econ., 5(1), pp.487-519.
- Banerjee, A., Duflo, E., Glennerster, R. and Kinnan, C., 2015. The miracle of microfinance? Evidence from a randomized evaluation. American Economic Journal: Applied Economics, 7(1), pp.22-53.
- Meager, R., 2019. Understanding the average impact of microcredit expansions: A bayesian hierarchical analysis of seven randomized experiments. American Economic Journal: Applied Economics, 11(1), pp.57-91.
- Garmaise, M.J. and Natividad, G., 2010. Information, the Cost of Credit, and Operational Efficiency: An Empirical Study of Microfinance. The Review of Financial Studies, 23(6), pp.2560-2590.

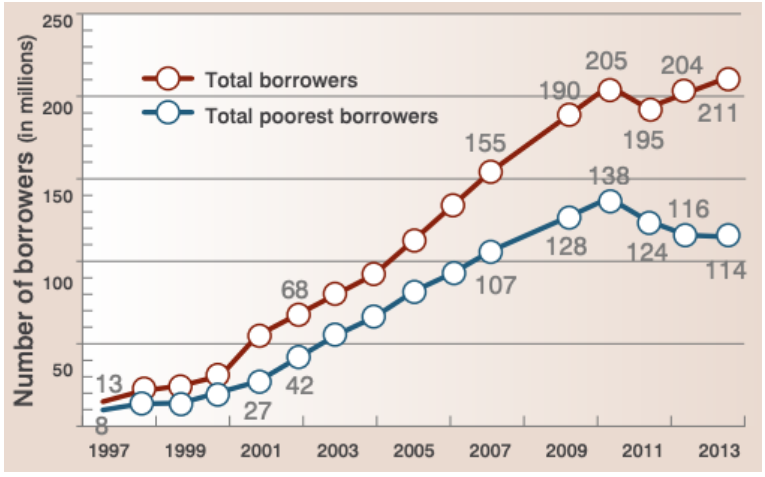
Poverty Alleviation

- One of the big ideas of the 1980's in the field of poverty alleviation was **microcredit**.
- The idea is simple: give small loans to a person in a very poor country, helping them to expand their business and lift themselves out of poverty.
- When the money is repaid, a new loan can be made to a new person, who can do the same again for their family.
- Microcredit became so popular that the World Bank set a target of universal financial access by 2020 as a major contributor to ending extreme poverty.

Poverty Alleviation

- Muhammed Yunus reshaped the way people thought about credit.
- He founded Grameen Bank in 1983 to provide the poor with a dependable source of credit.
- Prior to Yunus, the view was that lending to very poor people would trap them in debt.
- Instead, the view became that poor people could escape poverty by starting a micro-enterprise, making more money than they're being charged.
- This story became integral to women's empowerment.
- In 2006, Yunus won the Nobel Peace Prize.

Microcredit borrowers



- The 2006 Global Microcredit Summit had set a target of reaching 175 million borrowers in extreme poverty.
- While they may not have quite reached their target at that time, there was no doubt that microfinance institutions (MFIs) had massively opened up financial access.
- The *economic* basis of this expansion is:
  - Low interest rates (or at least lower than the alternatives)
  - Willingness to lend to those with no previous connection to the financial system—you just need to meet a set of simple and explicit criteria
- Contrast this to *moneylender* credit (what you've seen in the movies):
  - Very high lending rates
  - Limit their lending to people they already know

Traditional moneylenders

- Consider how traditional moneylenders work:
  - Impose a high interest rate to impose an incentive for borrowers to repay
  - High interest rates lower the size of the eventual loan
  - Interest rates on the small loan still need to cover the fixed cost of lending (finding out where the borrower lives, etc.)
  - This makes the interest rate need to be higher
  - The higher the interest rate, the more the borrower's incentives are distorted (repay or not?)
  - This implies the need for either cutting the size of the loan or spending additional resources monitoring the borrower
  - Either approach requires spending additional resources, requiring a higher interest rate
- Banerjee (2004) calls this the "credit multiplier".
- Small reductions in the cost of lending can therefore lead to large reductions in the interest rate.

A simple model of lending

- The lender makes a loan to a entrepreneur who has a business that will generate $F(k)$ units of output if k units of capital are invested.
- The entrepreneur has w units of wealth already, meaning they need to borrow the difference: $k - w$.
- At the end of the period, they will need to repay $R(k - w)$, where $R = (1 + r)$.
- Assume the entrepreneur can escape without paying the lender by spending some cost h on the entire sum borrowed.

A simple model of lending

- The borrower faces a choice between:
  - Repay: entrepreneur gets $F(k) - R(k - w)$
  - Escape: entrepreneur gets $F(k) - hk$
- The lender will want to choose k so that the borrower has an incentive to repay:

$$F(k) - R(k - w) > F(k) - hk, \quad \text{or} \quad \frac{k}{w} = \frac{r}{r - h}$$

- The predictions of this simple model so far
  - Borrowers will be rationed (receive less credit than is optimal)
  - Richer people can borrow more

A simple model of lending

- Assume the lender needs to pay a cost D to its depositors on each dollar lent (cost of capital).
- They also need to pay a fixed cost c of enforcement and administration.
- A zero-profit lender will optimise where:

$$R(k - w) = D(k - w) + c$$

- The lender must want to repay, so at the optimal they should have:

$$R(k - w) = hk$$

- Combining these two expressions, we get:

$$D(k-w)+c=hk \quad \text{or} \quad k=\frac{Dw-c}{D-h}$$

  which tells us how much the lender is willing to lend.

- In the expression $R(k-w)=D(k-w)+c$, substitute in for k from what we just worked out:

$$R=D+\frac{c(D-h)}{hw-c}$$

- We find the multiplier effect: *whenever the cost of funds D goes up, the interest rate goes up more than proportionally in order to cover the cost*.

- A higher interest rate gives the borrower more reason to escape, likely increasing the cost of monitoring.

Mechanics of Microfinance

- Group lending:
  - Insurance: If everyone's earnings are stochastic, then pooling earnings together to help the less fortunate repay is optimal.
  - Incentives: group members have better information about one another than the MFI, and they can also "socially" punish those who default.
- Dynamic incentives:
  - Repayment in the current period is typically tied to future loan disbursement.
  - For repayment to be the optimal choice, the growth of the disbursement needs to be higher than the interest rate.
- Transaction design:
  - Loan collection typically takes place in a group setting at a fixed place and time each week.
  - This saves time, acts as a reminder, and if a person cannot come to the meeting they can pass their money onto someone else.
  - It also acts as an automatic default publicization.

Mechanics of Microfinance

- Microcredit for savings:
  - Rutherford (2001) suggests that a person can spend a large sum of money for some one-time purchase, and then repay it over time.
  - For many, savings is impossible (theft, self-control, other demands).
  - The way you pay down the loan is effectively *saving* a little each week.
  - Borrowers with commitment issues can achieve their long-term objectives, since the loans officer will collect each week.
- Reputation:
  - MFIs put effort into distinguishing themselves from ordinary moneylenders: socially minded, with an aim for development.
  - Reputation matters for enforcement mechanism: public shaming.
  - Reputation matters for durability, which influences incentive to repay.

The story of microfinance

- Over the last decade, microfinance has fallen out of favour, gathering less and less support. Why?
- The answer: **Randomized Controlled Trials** or RCTs.
- In 2015, the American Economic Journal: Applied Economics published six RCTs on microfinance.
- They were RCTs in Bosnia & Herzegovina, Ethiopia, India, Mexico, Mongolia and Morocco; all conducted between 2006 and 2012.

Randomized Controlled Trials

- How do RCTs work in the real world?
- Much like medical trials, there are two groups: the treatment group and the control/comparison group:
  - The treatment group receive some intervention
  - The comparison group receives some placebo (either no intervention or a different intervention).
- After some time, we observe the difference in outcomes between the two groups.
- Then run a regression of:

$$y_{ia} = \alpha + \tau \times \text{Treatment}_{ia} + \gamma \text{X} + \varepsilon_{ia}$$

Where i is an individual, a is the area they live in, and X are control variables, τ gives us the intent-to-treat estimates.

Banerjee, Duflo, Glennerster, Kinnan (AEJ: Applied 2015)

- In 2005, 52 of 104 poor neighbourhoods in Hyderabad were randomly selected for the opening of a Spandana branch—one of the largest MFIs in India.
- Between 15 to 18 months after the introduction of microfinance, they conducted a household survey
  - Average 65 households in each neighbourhood; 6,850 in total
- By this time, other MFIs opened in both treatment and control regions, but the probability of receiving an MFI loan was 46% higher in treatment areas compared to comparison areas.
- A further 2 years later, they surveyed households again—by which time both groups had similar probabilities of receiving an MFI loan.

Banerjee, Duflo, Glennerster, Kinnan (AEJ: Applied 2015)

- By the first survey (15-18m) only 26.7% of eligible households had borrowed, compared to the 80% Spandana expected.
- Informal borrowing declined, and there's no significant difference in overall borrowing—the two are substitutes.
- The primary mechanism through which microfinance is intended to work is business creation.
- They find that 15-18 months after gaining access to MFIs, households are no more likely to be entrepreneurs, but they do invest more in the businesses that they have.
- There's an increase in average profits for existing businesses, but this is driven by a few very large companies:
  - Every quantile between the 5th and 95th percentile sees no difference in business profits.
  - The median new business is less profitable and smaller.

Banerjee, Duflo, Glennerster, Kinnan (AEJ: Applied 2015)

- After three years, businesses in the treatment group have significantly more assets and profits are now higher for the largest businesses.
- Yet the average business remains small and not very profitable.
- There is no difference in average consumption.
- There is no difference in women's empowerment or human development.
- By the end, 70% of eligible households still do not have an MFI loan.

The problem with RCTs

- The main concern with RCTs is **external validity**.
- External validity is the ability to apply the findings of a study beyond its original context—that is to generalise these findings to new places, people, cultures, times, etc.
- That is, can a study help you to predict what effect a specific treatment will have somewhere else?
- Deaton and Cartwright (2018) are the most vocal critics of special status being accorded to RCTs.

Meager (2019)

- Rachael Meager pools these six RCTs on microfinance, plus a 7th from 2011.
- She examines the effects on household business profit, expenditures, and revenues.
- She also examines heterogeneity at the same time by assuming that the estimated treatment effect (τ) in each place is drawn from a common distribution:

$$\hat{\tau}_k \sim \mathcal{N}(\tau_k, \hat{se}^2) \quad \forall k$$
$$\tau_k \sim \mathcal{N}(\tau, \sigma^2) \quad \forall k$$

- She estimates σ^2, even accounting for covariates of each situation sometimes:

$$\tau_k \sim \mathcal{N}(\tau + \beta W_k, \sigma^2) \quad \forall k$$

Meager (2019)

- If σ^2 is zero, then there is no unexplained heterogeneity in the estimates and τ_k is a perfectly externally valid for predicting $\tau_k k + 1$.
  - A policymaker can learn as much about the impact of microcredit in Ethiopia from a study in Mexico as from a study in Ethiopia itself.
- If σ^2 is large, then there is no external validity and there is negligible prediction ability in the estimates of τ_k.
  - A policymaker learns little about the impact of microcredit in Ethiopia from a study in Mexico.
- When σ^2 is small, she also estimates τ and this might then be a better estimate of what the treatment effect is in each context.

Combined treatment effects

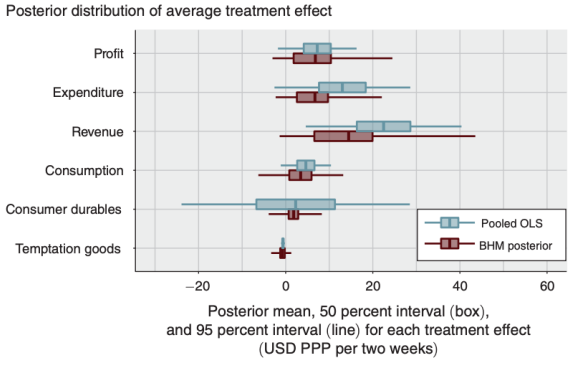
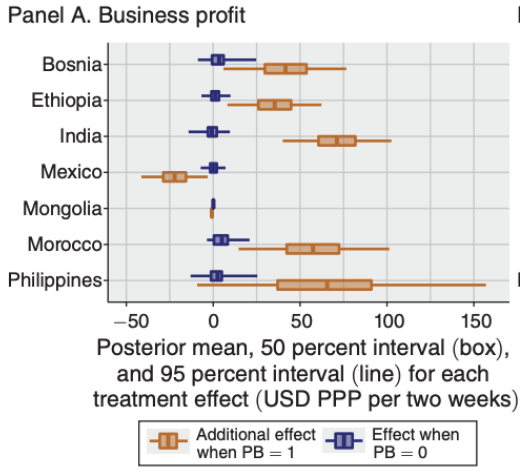


FIGURE 1. GRAPH OF POSTERIORS FOR EACH τ FROM THE MAIN SPECIFICATION OF THE JOINT BAYESIAN HIERARCHICAL MODEL (BHM), WITH THE FULL POOLING OLS INTERVALS FOR COMPARISON

Notes: For the BHM, the thin line covers the central 95 percent posterior interval, the box covers the central 50 percent posterior interval, and the vertical bar within the box marks the posterior mean. For the OLS, the thin line covers the standard 95 percent confidence interval, the box covers a 50 percent confidence interval computed in the same way, and the vertical bar within the box marks the estimate.

Comparison between prior business experience or not



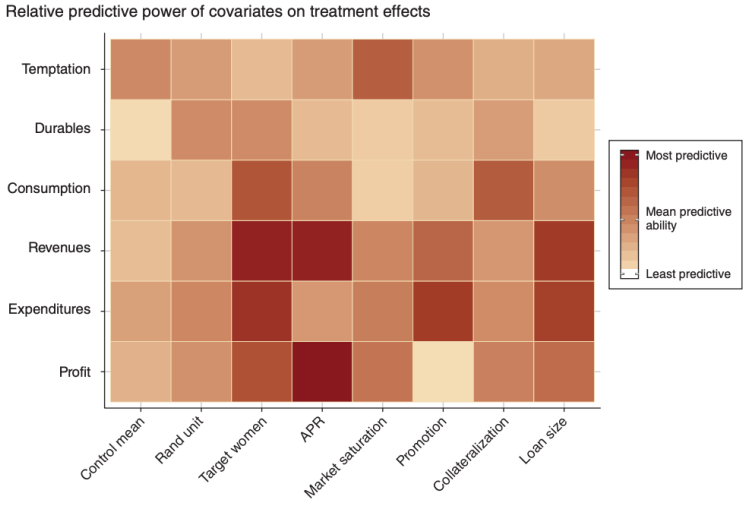


FIGURE 10. ABSOLUTE MAGNITUDE OF THE RIDGE REGRESSION COEFFICIENTS FOR ALL OUTCOMES AND COVARIATES

- She finds average treatment effects are small, around 5% of control group outcomes.
- She finds around 60% of variation is *sampling* variation, implying genuine heterogeneity is less than previously thought.
- This suggests the RCTs are reasonably externally valid.
- She finds that economic features of these RCTs better predict heterogeneity than the protocols of the RCTs, which is good.

Garmaise and Natividad (2010)

- Consider the other side of the question: how do MFIs get funded?
- In particular, what characteristics matter for getting low-cost funding?
- This is critical because MFIs typically do not rely on deposits for funding.
  - Funding is usually from banks or developmental agencies (IDB, World Bank, etc).
- Garmaise and Natividad use quasi-experimental variation to answer this question.
- A Microfinance Rating and Assessment Fund was set up by the IADB, providing subsidies to MFIs that sought a credit rating, viewed as a means to reducing informational problems.

Garmaise and Natividad (2010)

- The simplest approach is to estimate the effect of being evaluated on some interest cost:

$$\text{interest cost}_{it} = \alpha_i + \delta_t + \beta \times \text{evaluated}_{it} + \gamma \mathbf{X} + \varepsilon_{it}$$

- This misses the fact that MFIs themselves choose whether to be evaluated or not, meaning it is an endogenous variable.
- They search for an exogenous change in the probability of being evaluated.
- The Rating Fund had strict eligibility criteria to receive the subsidy:
  - Total assets between \$300k and \$30m
  - Average outstanding loans less than \$2,000

Regression discontinuity

- The probability of being evaluated jumps *discontinuously* at the eligibility criteria cutoff.
- They examine MFIs that cross the eligibility boundary after May 2001 (when the Fund was set up).
- They compare MFIs just within the eligibility criteria to MFIs just outside the criteria.
- They find that the probability of being evaluated jumps by 31 percentage points for MFIs just inside the criteria.
- Now think about running two regressions:
  - One for MFIs just above the criteria
  - One for MFIs just below the criteria

Regression discontinuity

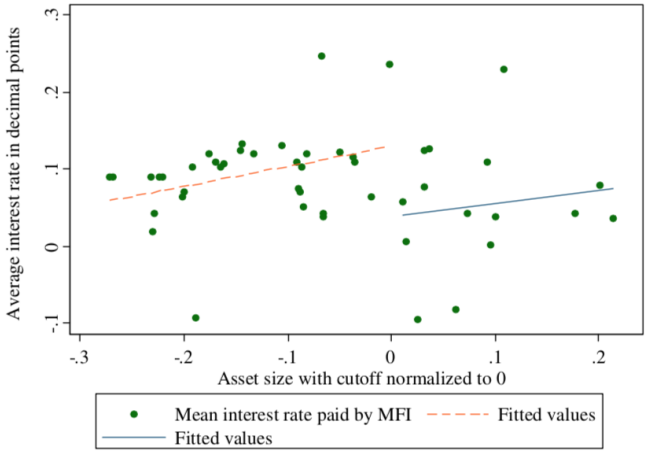


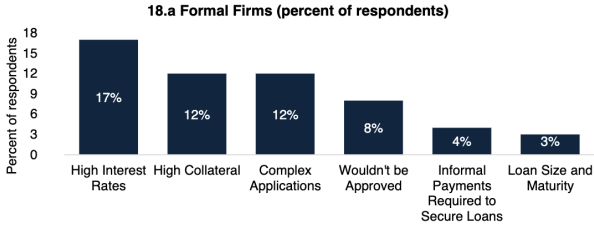
Figure 3
Interest rate and asset size around eligibility border
This figure shows the average interest rate paid by MFIs on their total loans outstanding and their asset size in millions of dollars around the eligibility border defined in Equation (3), plotting actual and linearly fitted values.

Results

- The figure offers a partial visualisation of their results.
- They find that the average interest rate falls by 550 basis points (5.5 pp), which is enormous compared to the average interest rate overall of 8 pp across all loans made to MFIs.
- These benefits accrue mostly to MFIs that borrow from commercial banks.
- Oddly, it doesn't increase the size of loans they're able to secure.

Gilez-Alvarez and Mooney (2018) on Barbados

Figure 18. Firms' Reasons for Not Applying for a Loan



Source: World Bank (2014).

Discussion

- What do we think about the applicability of microfinance institutions to the Caribbean context?
- Do you think they are necessary?
- Can microcredit lift Caribbean people out of poverty?

The End.