# *Individual Assignment #2: Microfinance Part 1*

Due: 2/9/2023

You are advising a microfinance institution that makes loans to entrepreneurs in low-income neighborhoods of Kolkata, India. So far, your client has required borrowers to start repayments two weeks after the loan disbursement. While the immediate payment obligation limits the risks of default, your client noticed that it had prevented borrowers from making high-return investments that take longer to pay off, blunting the impact of microfinance.

Your client is considering introducing a two-month grace period for loan repayment. If the grace period significantly improves borrowers' business outcomes without increasing the default rate by too much, adding it might allow your client to charge a higher interest rate and increase profits. Your task is to design and run a randomized controlled trial (RCT) to evaluate the impact of the grace period on default rates and business outcomes.

The data file *microfinance_csv* [1] contains information on a sample of 845 borrowers you will work with. You observe the group id, the loan amount, and a rich set of characteristics for each borrower. In this assignment, you will work on the experiment design and setup. In the next assignment, you will use additional data to evaluate the effects of the grace period on default rates and business outcomes.

(Note: you need the data only for question 3)

1. The baseline eight-week default rate is around 9%. Your client wants to be able to detect if the default rate increases to 27% with the grace period. The desired Type I error rate is 0.05 (i.e., a = 1.96), and the desired power is 0.8 (i.e., b = 0.84). If you randomly assign each borrower to the treatment group (i.e., grace period) or the control group (i.e., no grace period), **is the sample big enough for your analysis? Please show your work.**

2. You learned that the borrowers are in groups of 5 that regularly interact with each other. As a result, you have decided to do clustered random assignment by groups. **Is your sample still big enough for the clustered RCT? Please explain your reasoning clearly.**

3. You went ahead with the clustered RCT, with 84 groups assigned to the treatment group and 85 assigned to the control group. **Perform a covariate balance check on the loan amount and the borrowers' characteristics. Do you consider your randomization successful? Briefly explain your reasoning.**

[1] This data is a simplified version of the data used in Field et al. (2013).

Data Description

| **Variable** | **Description** |
|---|---|
| group_id | The identifier for each group of borrowers |
| GracePeriod | The borrower is granted the grace period (i.e., in the treatment group) |
| loan amount | Loan amount (in rupees) |
| Age | Age of the borrower |
| Married | The borrower is married |
| Years_Education | Years of education of the borrower |
| HH_size | Household size of the borrower |
| Shock_any | Experienced birth, death, or heavy rain in the family in the last 30 days |
| Has_Business | The borrower reported at least one business in operation |
| Homeowner | The borrower owns the house they live in |