

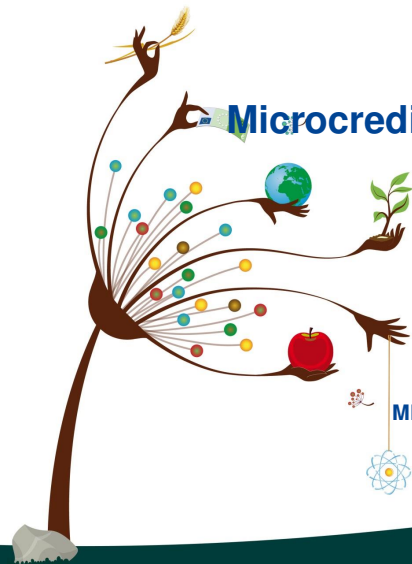
# The European Commission's science and knowledge service

## Joint Research Centre Measuring the Impact of Microcredit with Counterfactual Impact Evaluations

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1. Introduction
2. Objective of the workshop
3. Review of CIE methods

4. Data Requirements
5. Conclusions and possible collaboration

# Presentation Outline

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# What is an impact evaluation (IE)?

- ▶ Is your microfinance programme successful?

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- ▶ **IE = identify and quantify changes experienced by participants as a result of the programme**
- ▶ ≠ anecdotal evidence, correlations
- ▶ ≠ financial analysis, monitoring, effectiveness / operational evaluation (complementary)

# What is an impact evaluation (IE)?

- ▶ Is your microfinance programme successful?
- ▶ **IE = identify and quantify changes experienced by participants as a result of the programme**
- ▶ ≠ anecdotal evidence, correlations
- ▶ ≠ financial analysis, monitoring, effectiveness / operational evaluation (complementary)
- ▶ What would you like to know about your beneficiaries?

# Why is it important?

- ▶ Determine the **difference YOU are making** ⇒ **confidence, satisfaction**
- ▶ **Attract and justify** private and public funding
- ▶ Acquire **credibility** to deal with skeptical audiences and stakeholders: *evidence-based policy making*
- ▶ **Improve** microfinance products and services (negative results are also important!)
- ▶ Ensure **highest returns and sustainability** of programme

# How to evaluate the impact of microcredit, MC, (I)?

## Take the following example:

- ▶ Consider we have three successful loan applications
  - ▶ Yanos, Elza, and Sam (YES) have received MC to boost their businesses
- ▶ We are interested in the impact of MC on YES' **businesses performance** (e.g. turnover) **12 months after** having received MC.

## How to evaluate the impact of MC (II)?

- ▶ We could compare turnover **before** and **after** receiving MC

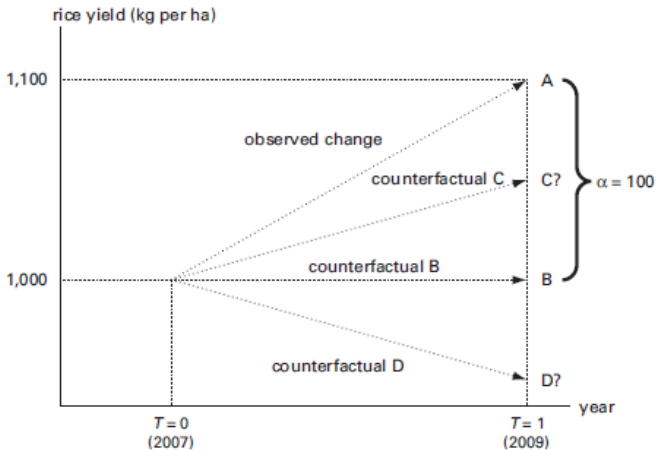


## How to evaluate the impact of MC (II)?

- ▶ We could compare turnover **before** and **after** receiving MC
- ▶ This is **problematic** because such comparison will also capture other factors not related to MC such as
  - ▶ ... (un)favourable economic / environmental conditions
  - ▶ ... characteristics of the applicants / projects
- ▶ **Before/After Comparison** = MC effect +/- Economic conditions +/- ind/project characteristics

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source: Gertler et al. 2011

## How to evaluate the impact of MC (III)?

### To remove effect of economic / environmental conditions:

- ▶ **Data on rejected applicants** are needed too!
- ▶ If we have data on Nicolas, Oliver, and Tania (NOT), who live in **same environment** but had their **applications rejected**, we can compare YES' turnovers with NOT's:
  - (1) YES, Before/After Comparison = **MC effect** +/- Eco conditions +/- ind/project characteristics
  - (2) NOT, Before/After Comparison = +/- Eco conditions +/- ind/project characteristics**(1)-(2) = MC effect** +/- ind/project characteristics

# How to evaluate the impact of MC (IV)?

## To remove the effect of ind/project characteristics:

- ▶ Data on rejected applicants who are **as similar as possible** to successful applicants are needed!
    - ▶ The **COUNTERFACTUAL**
  - ▶ In that case Successful and Rejected applicants have on **average** the same individual/project characteristics
    - (1) Successful A, Before/After Comparison = **MC effect** +/- Eco conditions +/- ind/project characteristics
    - (2) Rejected A, Before/After Comparison = +/- Eco conditions +/- ind/project characteristics
- (1)-(2) = MC effect**

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# How to evaluate the impact of MC?

**Via counterfactual impact evaluation!**



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# Objective of the workshop

- ▶ Introduce main **CIE methods** that could be applied to measure the impact of MC on beneficiaries
- ▶ Discuss **data requirements** for CIE
- ▶ Discuss possible **collaborations** to measure the effect of MC

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## What is a CIE? (again)

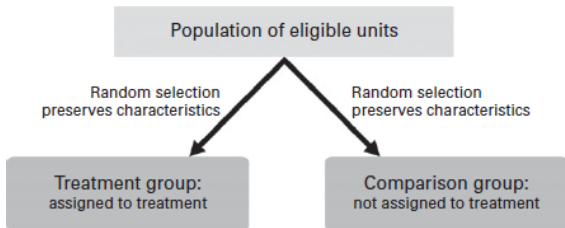
- ▶ CIE measures whether MC has an **impact** and how **large** the impact is
  - ▶ **Causal Impact**: are beneficiaries better off because of MC than they would have been in the absence of MC?
  - ▶ How they would have been in the absence of the MC?
  - ▶ *Impossible* to measure directly → Need of a **counterfactual**
  - ▶ CIE: create **convincing and reasonable comparison group**
- ▶ Focusing **only on beneficiaries** *cannot* identify causal impact: CIE is the **only way** to answer **causal** questions in a credible (and useful) way

# How to find a good counterfactual?

- ▶ **Experimental** method:
  - ▶ **Randomization**
- ▶ **Quasi-experimental** methods:
  - ▶ **Regression discontinuity design**
  - ▶ **Difference-in-difference**
  - ▶ **Propensity score matching**
  - ▶ Instrumental variables
  - ▶ Combination of methods

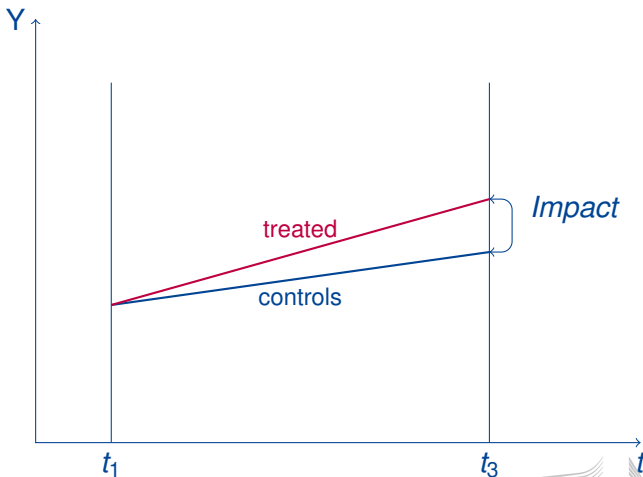
## Experimental approach

- ▶ Gold standard, 'perfect' counterfactual
- ▶ Potential beneficiaries of an intervention **randomly** assigned to the treatment and control groups
- ▶ Random assignment  $\Rightarrow$  treatment and control groups **statistically equivalent** *except* for treatment status



source: Gertler et al. 2011

Treatment and control groups statistically equivalent  $\Rightarrow$   
**differences in outcomes** between groups only attributable to  
intervention



# How to randomize?

- ▶ Oversubscription
- ▶ Randomized phase-in
- ▶ Within-group randomization
- ▶ Encouragement design

## Example #1: my study of microsavings in Italy

### Select randomly marginal clients from pool of existing clients of partner bank

- ▶ owning only one current account, low number of monthly transactions, low average monthly balance
- ▶ stratify on migrant status

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## Design

	E1: Neutral encouragement (oral + brochure)	E2: Motivational encouragement (brochure + video)
A1: liquid savings account ( <i>libretto</i> )	T1	T2
A2: soft-commitment account ( <i>conto Mano a Mano</i> )	T3	T4
A0: no account	C1	C2

## Other examples of randomization

- ▶ ADIE's Créajeunes programme in France (Crepon et al. 2014)
- ▶ EKI's microcredit in Bosnia and Herzegovina (B. Augsburg, R. De Haas, H. Harmgart, C. Meghir, "The Impacts of Microcredit: Evidence from Bosnia and Herzegovina", *American Economic Journal: Applied*, 2015, 7(1): 183-203)
- ▶ PROGRESA / Oportunidades Mexico
- ▶ etc.



# Pros and Cons of Randomization (I)

## Cons

- ▶ **Ethical** issues: sometimes hard to justify discrimination between individuals who can benefit and cannot
  - ▶ BUT fairest and most transparent rule to allocate scarce resources among equally-deserving populations
  - ▶ BUT helps finding good policy that will have highest impact for everyone afterwards
- ▶ **Timing**: plan ahead, delay before having the possibility to evaluate effects
- ▶ **Organization**: abide strictly by protocol, need large numbers

## Pros and Cons of Randomization (II)

### Pros

- ▶ **Easy** implementation - !! need relevant product !!
- ▶ **Fair and transparent** rationing mechanism (same chance)
- ▶ Easy statistical analysis leading to **robust, indisputable results**
- ▶ Long-run **benefits for society**

# How to find a good counterfactual?

- ▶ Experimental method - Randomization
- ▶ **Quasi-experimental** methods: mimic a randomization when the random assignment is not possible
  - ▶ **Regression discontinuity design - RDD**
  - ▶ Difference-in-difference
  - ▶ Propensity score matching
  - ▶ Instrumental variables
  - ▶ Combination of methods

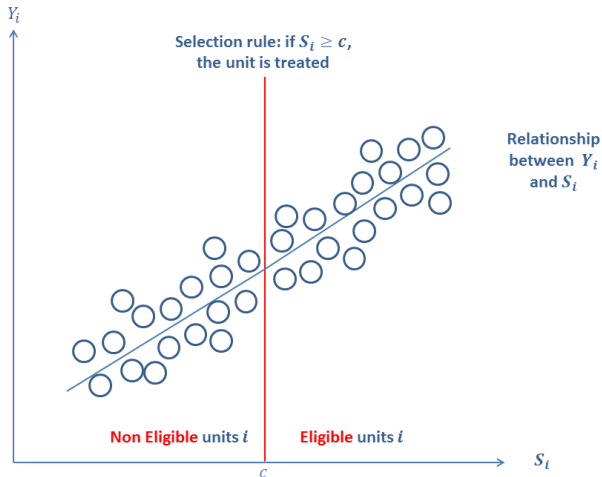
# Regression discontinuity design: intuition

- ▶ Eligibility for a program determined by a **rule**
- ▶ Treatment assignment based on the value of a **continuous variable**  $S_i$  (i.e. a score)
  - ▶ Treatment= 1 if  $S_i \geq c$
  - ▶ Treatment= 0 if  $S_i < c$
- ▶ Microcredit is **not randomly assigned**

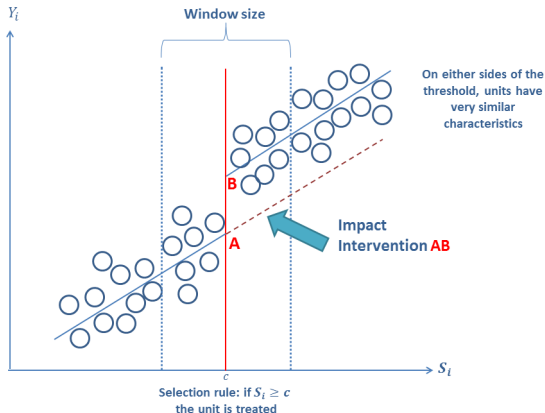
# Regression Discontinuity Design: Intuition

- ▶ If applicants are selected based on score  $S_i$  (MC is given if applicant's score  $\geq$  some threshold  $c$ )
  - ▶ Applicants **just above threshold** (selected but close to be rejected)  $\Rightarrow$  Treated
  - ▶ Applicants **just below threshold** (rejected but close to be selected)  $\Rightarrow$  Controls

# RDD Intuition: **Before** the intervention



# RDD Intuition: **After** the intervention



- **Assumption:** there are not other policies using the same eligibility criteria that affect the outcome

# RDD Intuition

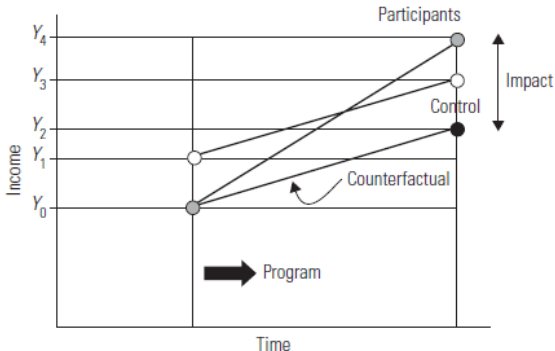
- ▶ **Eligibility rule:** On either sides of  $c$ , individuals have very similar characteristics, but some are treated and others are not
- ▶ **Counterfactual:** units above the cut-off who did not participate, i.e marginal non beneficiaries
- ▶ **Effect** of the intervention: difference in the average performance between marginal beneficiaries and marginal non beneficiaries



# How to find a good counterfactual?

- ▶ Experimental method - Randomization
- ▶ **Quasi-experimental** methods: mimic a randomization when the random assignment is not possible
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  - ▶ **Difference-in-difference**
  - ▶ Propensity score matching
  - ▶ Instrumental variables
  - ▶ Combination of methods

# Diff-in-Diff



	After	Before	Difference
Treatment/enrolled	$B$	$A$	$B - A$
Comparison/ nonenrolled	$D$	$C$	$D - C$
Difference	$B - D$	$A - C$	$DD = (B - A) - (D - C)$

source: Gertler et al. 2011

## Diff-in-Diff: key points

- ▶ Can be applied when programme assignment is less clear and/or randomization or RDD are not feasible
- ▶ But require **baseline data**
- ▶ ... and stronger assumptions: **parallel trends**
  - ▶ eliminates only differences between treated and controls that are *constant over time*
  - ▶ cannot be directly tested

## Example: my study of Indian SHGs

- ▶ Collected LSMS data on participants, non participants in same villages and households in control villages, from before start of programme until 7 years afterwards
- ▶ Computed differential evolution of children belonging to SHG households (or villages) as compared to households in control villages from the same district

# How to find a good counterfactual?

- ▶ Experimental method - Randomization
- ▶ Quasi-experimental methods
  - ▶ Regression discontinuity design
  - ▶ Difference-in-difference
  - ▶ **Propensity score matching - PSM**
  - ▶ Instrumental variables
  - ▶ Combination of methods

## PSM: Intuition

- ▶ To use when **no credit score system** employed to select successful applicants
- ▶ **Match** selected applicants to rejected ones that are very **similar** in terms of relevant characteristics at the time of the application, e.g.:
  - ▶ Business type, previous labour market experience,
  - ▶ Age, education
  - ▶ Gender, family composition, etc.
- ▶ **Crucial difference with RDD**: match based on **observable** characteristics and not on an **exogenous assignment rule**

## PSM: Intuition (I)

- ▶ **Ideally** match **each successful applicant** with a **rejected applicant** with exactly the same characteristics relevant for the selection process
- ▶ **Problem:** As the number of characteristics determining selection increases it is more and more difficult to find comparable individuals)
- ▶ **Impact:** Compare the before/after difference in the outcomes between the similar rejected and successful applicants
- ▶ To find a **good counterfactual** rich information on individual/project characteristics is needed

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VIDEO





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## Information/Data needed (I)

- ▶ Need to know criteria used to select successful applicants
  - ▶ **Subjective** evaluations?
  - ▶ Use of a **credit score** to assess the applications and eventually grant the credit?
  - ▶ If yes, based on which information?
- ▶ Combination of credit score and other criteria?

**Need to know this information to understand which CIE method(s) to use**

## Information/Data needed (II)

- ▶ Need to have **access** on the data you store about applicants
- ▶ To carry out a CIE, we need information about **successful** applicants (treated) and **rejected** applicants (control group)
- ▶ **characteristics** of applicants: e.g., gender, family composition, education, labour market status, residence, characteristics of the business plan, type and amount of credit

## Information/Data needed (III)

Follow up survey:

- ▶ Successful and rejected applicants should be **re-contacted** sometime after the application for MC
- ▶ It is important to interview them to inquire about their situation (the outcome variable): e.g. labour market status, social inclusion, wellbeing, etc.

## How does data only on beneficiaries look like

	A	B	C	D	E	F	G
1	ID	Microcredit	Gender (1=Male)	Married	Nr children	Highest Education attained	Self-employed
2	1	1	1	1	2	upper secondary	1
3	2	1	0	1	3	lower secondary	1
4	3	1	1	1	0	tertiary	0
5	4	1	0	1	0	tertiary	1
6	5	1	1	0	2	lower secondary	1
7	6	1	1	1	0	primary	0
8	7	1	0	1	2	upper secondary	1
9	8	1	1	0	0	primary	0
10	9	1	0	0	0	lower secondary	1
11	10	1	1	0	2	upper secondary	0
12	11	1	1	1	1	lower secondary	1
13	12	1	1	0	0	upper secondary	1
14	13	1	0	1	0	tertiary	0
15	14	1	0	0	2	primary	1
16	15	1	0	0	4	lower secondary	1
17	16	1	1	1	3	tertiary	0
18	17	1	1	1	0	upper secondary	1
19	18	1	0	0	3	lower secondary	0

## How should we organize the data

	A	B	C	D	E	F	G
1	ID	Microcredit	Gender (1=Male)	Married	Nr children	Highest Education attained	Self-employed
2	1	1	1	1	2	upper secondary	1
3	2	0	1	0	0	upper secondary	0
4	3	1	0	1	3	lower secondary	1
5	4	1	1	1	0	tertiary	0
6	5	1	0	1	0	tertiary	1
7	6	0	0	1	1	primary	1
8	7	0	0	1	2	upper secondary	0
9	8	1	1	0	2	lower secondary	1
10	9	0	0	0	3	upper secondary	0
11	10	1	1	1	0	primary	0
12	11	0	0	1	3	lower secondary	1
13	12	1	0	0	2	primary	1
14	13	0	1	1	2	lower secondary	1
15	14	1	1	1	0	primary	0
16	15	0	1	0	2	lower secondary	0
17	16	0	0	1	2	lower secondary	1
18	17	0	1	0	4	upper secondary	0
19	18	0	0	1	3	lower secondary	1
20	19	1	1	0	0	lower secondary	1

# Privacy

- ▶ The data needed for CIE are private information typically protected by **privacy rules**
- ▶ **Follow-up interviews** will be carried out in full respect of privacy rules and keeping anonymity (⇒ modality to be discussed with you)
- ▶ No private information will be disclosed and the anonymity of your client will be preserved

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# Roadmap for implementing a CIE

1. Decide what to evaluate and be convinced about it
2. Lay down objectives, policy questions that interest you
3. Develop hypotheses / theory of change
4. Choose indicators
5. Check with JRC if there is scope for a collaboration
6. Choose evaluation design and sample in partnership with evaluation team
7. Carry out evaluation in partnership with evaluation team
8. Analyze data, write report, and disseminate results

# Fill in the questionnaire!

**Are you interested in collaborating with us?**

*Please fill in the questionnaire so that we can understand better which kind of method can be best suited for your case*

**For any further information, please come and talk to us!**

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**Thank you very much for your attention!**

