GENDER Impact Platform

CGIAR

Integrating Gender into Causal Impact Assessments: understanding the scope of causal impact assessments and how to incorporate gender effectively

Causal Impact Assessment Methodologies

March 2025

Diana Lopez-Avila
davila@cgiar.org
Senior Scientist
Gender and Inclusion Accelerator-CGIAR

IMPACT ASSESSMENT:

CAUSAL IMPACT ASSESSMENT:

It focuses on identifying the **CAUSAL RELATIONSHIP** between the intervention and the observed changes. It is designed to **attribute the changes** observed to the innovation or intervention studied

NON-CAUSAL IMPACT ASSESSMENT:

It assesses the **contribution of the program/innovation/intervention to the observed changes.** It does **not establish a direct causal link** between the program and the changes. The **observed changes cannot be definitively attributed** to the intervention itself.

QUANTITATIVE:
Effects-of-causes approach

QUALITATIVE:
Causes-of-effect approach

Causal Impact Assessments

Through a causal impact assessment, the basic question we want to answer is “What is the causal effect of a program/intervention (P) on an outcome of interest (Y)”?

$$\Delta = (Y|P = 1) - (Y|P = 0)$$

Counterfactual

Causal Impact Assessments-Counterfactual

To implement a causal impact assessment, we need to have a **comparison group (or COUNTERFACTUAL).** The way we choose the counterfactual is crucial for understanding the true effect of a program, as they help isolate the effects of the intervention from other external factors.

- It represents hypothetical scenarios that illustrate what would have happened to participants had they not received the intervention.
- Because the counterfactual is impossible to measure directly, methods of causal impact assessments try to mimic the counterfactual by selecting a comparison group of non-participants who closely resemble the participants had they not been treated.
  - The way the counterfactual is chosen is what differentiates experimental from quasi-experimental methods

Causal Impact Assessments-Counterfactual

A comparison group is a good counterfactual if:

- ✓ The average characteristics of the treatment group and the comparison group must be the same in the absence of the program.
- ✓ The treatment should not affect the comparison group either directly or indirectly (contamination)
- ✓ The only difference between the treatment and control groups, then, is their participation in the intervention itself, and the difference in their outcomes therefore represents the impact of the intervention or program.

Inappropriate estimates of a counterfactual

- *Before-and-after comparisons* (also known as *pre-post comparisons*):
  - Compare the outcomes of the same group before and after participating in a program/receiving an intervention.

- Enrolled-and-non enrolled (or self-selected) comparisons:
  - Compare the outcomes of a group that chooses to participate in a program with those of a group that chooses not to participate.

Why do you think these comparisons don't have a good counterfactual?

Please type your answers in the chat

Inappropriate estimates of a counterfactual

Before & After:

- The counterfactual is the outcome of the treated group before the intervention started.
- **This comparison assumes that, without the program, participants' outcomes (Y) would be the same as before the program.**

- Interventions are implemented over several months or years and many things can change over that period

Enrolled vs Non-Enrolled:

- The counterfactual is a group of individuals who decided NOT to participate in the intervention.
- **Self-selected comparison groups provide biased estimates due to unobserved characteristics influencing participation**.

- Those who opted to not enroll in the program may be different to those who enroll in unobservable traits like motivation, self-efficacy, or other personal factors that influence their decision to participate.

If the comparison group poorly represents the counterfactual, the estimate of the causal effect will be biased and invalid

Experimental Methods

Randomized Controlled Trials (RCT)

- All eligible units in a sample are randomly assigned to treatment and control groups (e.g., there can be more than one treatment group)
- Random assignment ensures treatment and control units are, on average, similar in both observed and unobserved characteristics.
- Compare outcomes between randomly assigned participants and non-participants after the program.
- The only difference between the treatment and control groups is their participation in the intervention, so the outcome difference reflects the program's effect.

Randomized Controlled Trials (RCTs)

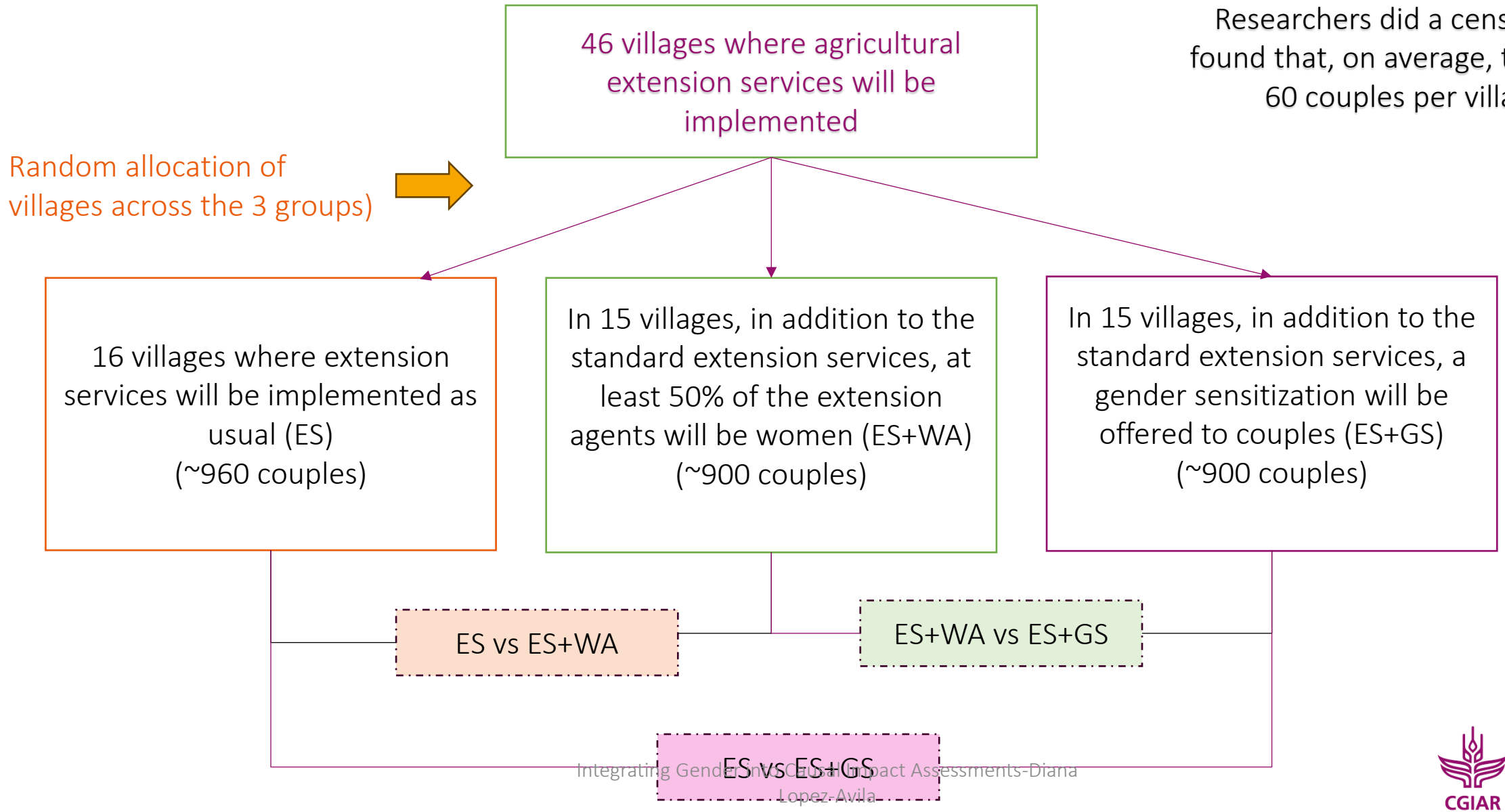
- Let's think about the following situation:

  - A group of researchers is planning to assess the impact of an extension service intervention, with a focus on **testing different approaches to better target women and increase their participation in agricultural decision-making.**

    - **Incorporating a gender sensitization** component on women's roles in agriculture, **targeted at couples**.
    - **Ensuring that at least 50% of the extension agents are women**

To test which approach is more effective, they propose the following randomized controlled trial

Randomized Controlled Trials (RCTs)



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Randomized Controlled Trials (RCTs)

- Let’s think about the following research questions and discuss which comparison allow researchers to answer each question:

Does a having a good representation of female agents among extension agents increase adoption rates and women's participation in agricultural decisions?	ES vs ES+WA
Does a implementing a gender sensitization component targeted to couples (addressing women’s role in agriculture) increase adoption rates and women's participation in agricultural decisions?	ES+WA vs ES+GS
Is a gender sensitization more effective than having a good representation of female agents among extension agents?	ES vs ES+GS

Randomized Controlled Trials (RCTs)-Timeline

- ✓ The intervention to test is identified and the research questions of interest, as well as the planned experimental design
- ✓ If the target population (e.g., the population that is going to be part of the study) hasn't been identify, a census or identification mapping is conducted
- ✓ Questionnaires are designed to measure key outcomes of interest- key to determine from whom data will be collected (e.g., primary male, primary female, other household members)
- ✓ Power size calculations are conducted to identify the sample size needed to measure an effect (the smaller the effect expected, the larger the sample needed)
- ✓ Baseline data collection takes place
- ✓ Randomization is conducted (through a statistical package) and balance tests are implemented
- ✓ The intervention starts and is implemented
- ✓ Follow up data collections take place depending on the ToC and times in which effects are expected to be observed

Randomized Controlled Trials (RCTs)-Timeline

- ✓ Power size calculations:
  - ✓ Power calculations are essential to determine the minimum sample size required to detect an effect of size X in the outcome of interest.
  - ✓ If multiple key outcomes are being assessed, power calculations should be conducted for each, and the largest required sample size should be used.
  - ✓ In many cases, when data from the target sample is unavailable, we must rely on data from a similar study or context.
  - ✓ Keep in mind that when randomizing at the group (or cluster) level (e.g., villages), the number of clusters is crucial. While cluster size matters, the total number of clusters is what mostly determines the statistical power.
- ✓ Balance Tests
  - Once BL data has been collected and the randomization has been done, we need to compute balance tests, that is to compare the different treatment and control groups across key socio demographic characteristics and outcomes of interest to ensure they are balanced (e.g., we don't observe large and significant differences between groups)

Randomized Controlled Trials (RCTs)

- Considerations to have in mind when designing and implemented a randomized controlled trial:

➢ **Are baseline characteristics balanced?** Based on pre-intervention data, we need to test whether the groups are comparable, ensuring there are no statistically significant differences in baseline characteristics, particularly in those that correlate with the outcomes of interest (e.g., adoption rates and women's participation in agricultural decisions)

➢ **Has noncompliance occurred?** Verify that all eligible units received the treatment they were supposed to receive

  ➢ There is no contamination (e.g., farmers in villages assigned to ES were also part of the gender sensitization)

  ➢ Many male spouses in villages in group ES+GS didn't participate in the gender sensitization campaign

➢ **Has there been substantial attrition, and does it differ between treatment and control groups?** Attrition may occur between data collection rounds due to factors like migration, death, or refusal to participate. If a significant portion of the sample is lost, it can lead to power issues and compromise the ability to detect an effect. Additionally, if attrition differs between groups, the results may be biased.

Quasi-experimental methods

- Some of the quasi-experimental methods available are:
  - Matching
  - Differences-in-Differences
  - Regression Discontinuity Design

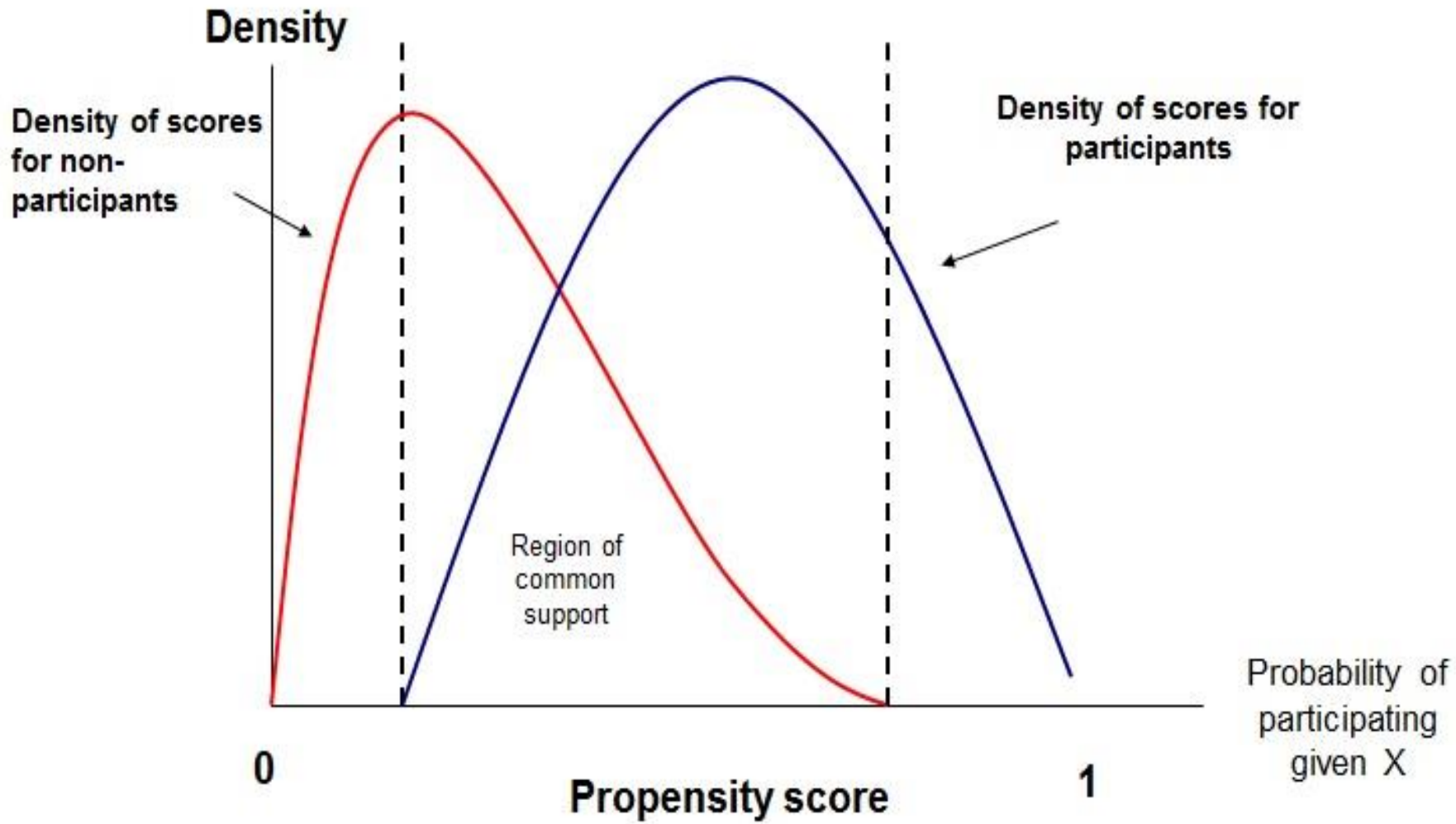
There is a counterfactual group BUT is NOT RANDOMLY chosen

Quasi-experimental methods : Matching

- What does this methodology do?
  - **Matches** individuals in the **treatment group** to those in the **control group** based on **observable characteristics.**
  - Pairs each treated individual with one or more comparable individuals from the potential control group.
  - Estimates the probability of treatment/program participation using observed characteristics.
  - **Retains only treated and control individuals with similar likelihoods of being treated**, ensuring comparability.

Key assumption: participation into treatment is only defined by observable characteristics

Quasi-experimental methods : Matching



Quasi-experimental methods : Matching

- Key Considerations for Identifying a Control Group:

  - ✓ **Larger Control Group:** The control group should be bigger than the treatment group, as some units may not serve as good matches and will need to be excluded from the analysis.

  - ✓ **Eligibility Criteria**: The same criteria applied to the treatment group (e.g., land size, household composition, plot characteristics, household income) must also apply to the control group.

  - ✓ **Match Based on Pre-Intervention Characteristics:** Matching should be done using baseline (BL) data collected before the intervention. This requires panel data, where the same units are observed multiple times.

    - ✓ **Addressing Lack of BL Data:** If baseline data is unavailable, you can attempt to match using variables which are (most likely) unaffected by the intervention

      - ✓ Matching on post-intervention characteristics really compromises the accuracy and validity of the results.

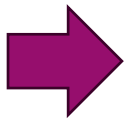
The power of the collective empowers women: Evidence from self-help groups in India.

- **Motivation/Problem:** Women's self-help groups (SHGs) in rural South Asia, particularly India, have evolved from savings and credit models to platforms promoting health, governance, and social equity. Despite their success, evidence on their impact on women's empowerment remains mixed.
- **Methods:**
  - This paper uses panel data from 1,470 rural Indian women across five states to assess the impact of SHG membership on women's empowerment in agriculture. It employs the Women's Empowerment in Agriculture Index (pro-WEAI) and the abbreviated A-WEAI to measure empowerment at the individual and household levels.
  - They construct a comparison group by matching SHG members to nonmembers based on observable respondent, household and community characteristics.
  - Since SHGs existed in the sample villages at baseline, data on these variables before women became members is unavailable, posing a challenge for ensuring proper matching.
  - To reduce endogeneity bias, the study uses SHG membership at midline and matches on predetermined, exogenous variables measured at baseline, including women's characteristics, household traits, time spent on household tasks, and village, district, and state characteristics.

Kumar, N., Raghunathan, K., Arrieta, A., Jilani, A., & Pandey, S. (2021). The power of the collective empowers women: Evidence from self-help groups in India. World Development, 146, 105579.

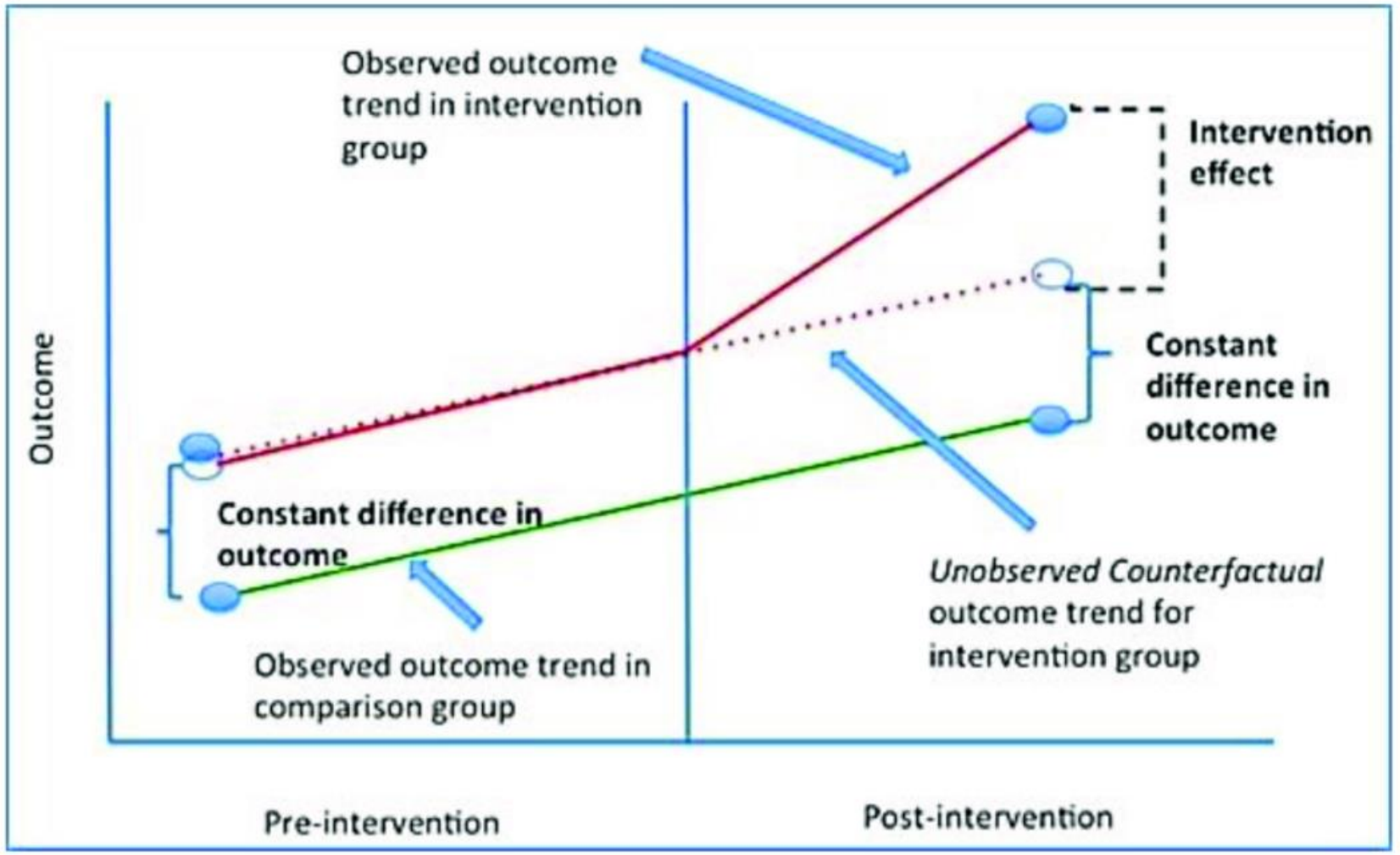
Quasi-experimental methods : Differences-in-Differences

- Difference-in-differences **compares changes in outcomes over time** between units enrolled in a program (**treatment group**) and those that are not (**comparison group**)
  - Instead of comparing outcomes between the treatment and comparison groups after the intervention, the difference-in-differences method compares trends between the two groups over time
  - This approach allows for **correcting any differences between** the treatment and comparison groups **that remain constant over time**



- Key assumption to test: existence of parallel trends in the outcome of interest before the intervention
- We need data for at least 3 points in time: before the intervention, when the intervention started and after the intervention

Quasi-experimental methods : Differences-in-Differences



Graph taken from https://www.researchgate.net/figure/Graph-for-Difference-in-Difference-estimation_fig1_368245697

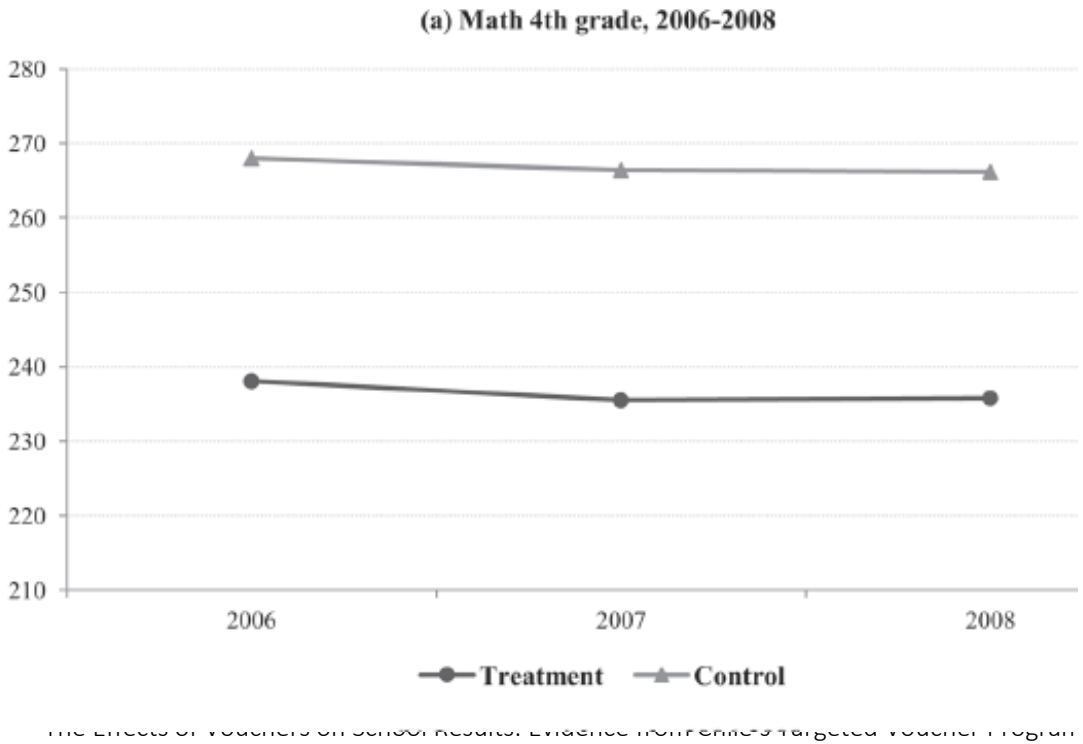
The Effects of Vouchers on School Results: Evidence from Chile's Targeted Voucher Program.

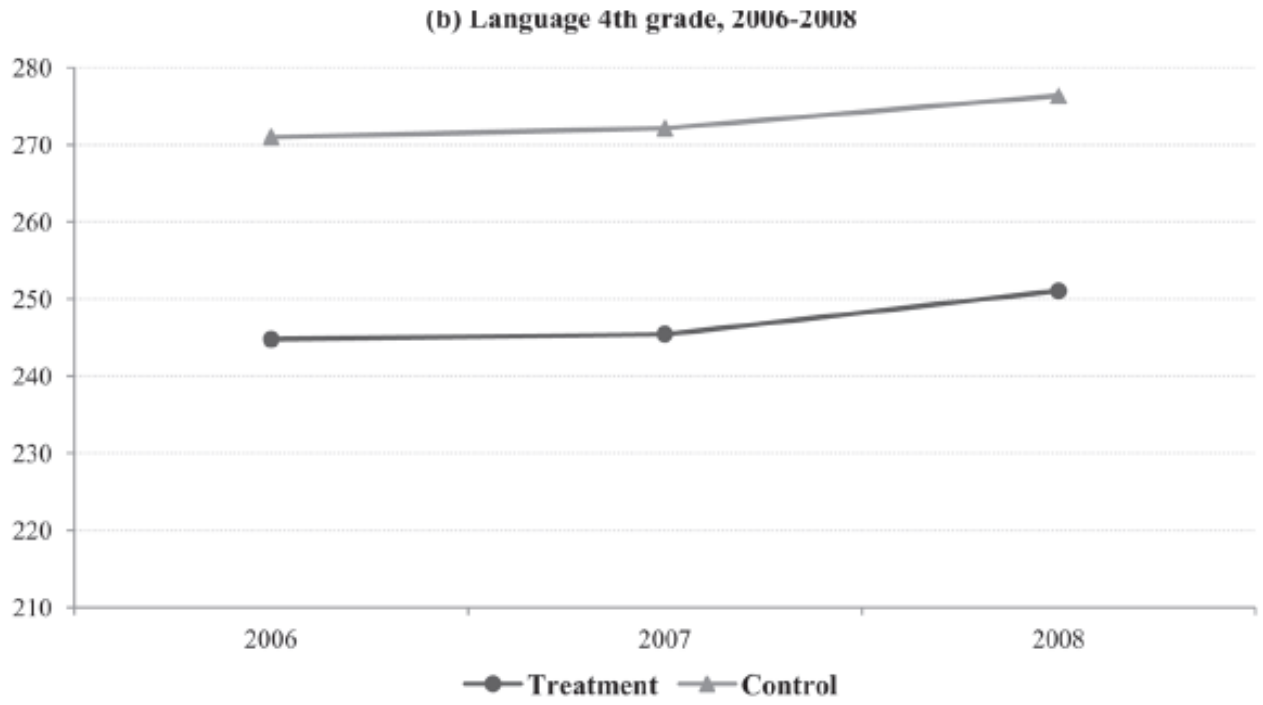
- **Motivation/Problem:** The Chilean education system includes private, public, and voucher-subsidized private schools. Voucher schools receive the same funding per student as public schools, may charge additional fees, have competitive admissions, and have more flexibility in hiring and dismissing teachers.
- **Methods:**
  - The dataset includes public and voucher-subsidized private schools, along with student and family socioeconomic information and standardized test results from 2006 to 2011.
  - The analysis focuses on schools that participated in the program from 2009 to 2011, with at least 20 students taking standardized tests, using the average 4th-grade math and language scores as the outcome variable.

The Effects of Vouchers on School Results: Evidence from Chile's Targeted Voucher Program. Journal of Human Capital, 2014, vol. 8, no. 4.

The Effects of Vouchers on School Results: Evidence from Chile's Targeted Voucher Program.

Before the program (2006–2008), treatment (SEP) and control schools showed similar trends in the outcome variable of interest.





Quasi-experimental methods : Regression Discontinuity Design

- Regression Discontinuity Design (RDD) is a methodology suited for interventions that use a continuous eligibility index (or variable) with a clear cutoff score to determine participant eligibility.

- Key considerations:
  - The index must be continuous and smoothly ranked, like poverty scores or test scores, but not categorical variables like employment status or education level.
  - A clearly defined cutoff score must determine eligibility, such as a poverty index below 50 or an age threshold for pensions.
  - The cutoff must be unique to the program being evaluated, ensuring no other programs use the same eligibility threshold.
  - Scores must not be manipulable by enumerators, beneficiaries, or administrators to maintain the integrity of the evaluation.

Quasi-experimental methods : Regression Discontinuity Design

- Consider an agriculture program that aims to improve total rice yields by subsidizing farmers' purchase of fertilizer.
  - The program targets small and medium-size farms, which it classifies as farms with fewer than 50 hectares of land.
  - Farms are eligible for fertilizer subsidies if they have less than 50 hectares, while those with 50 or more are not.
    - Farms just below the cutoff (e.g., 49.9 ha) are similar to those just above (e.g., 50.1 ha), except for program participation.

This allows for comparison to assess the causal effect of the subsidy

Quasi-experimental methods : Regression Discontinuity Design

Figure 6.1 Rice Yield, Smaller Farms versus Larger Farms (Baseline)

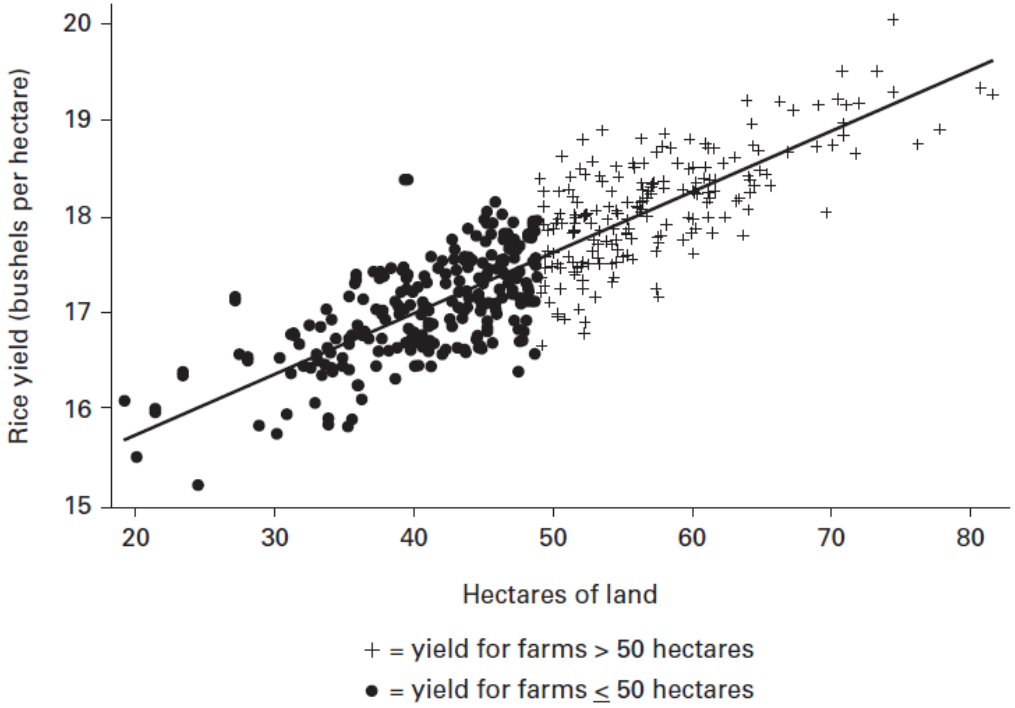
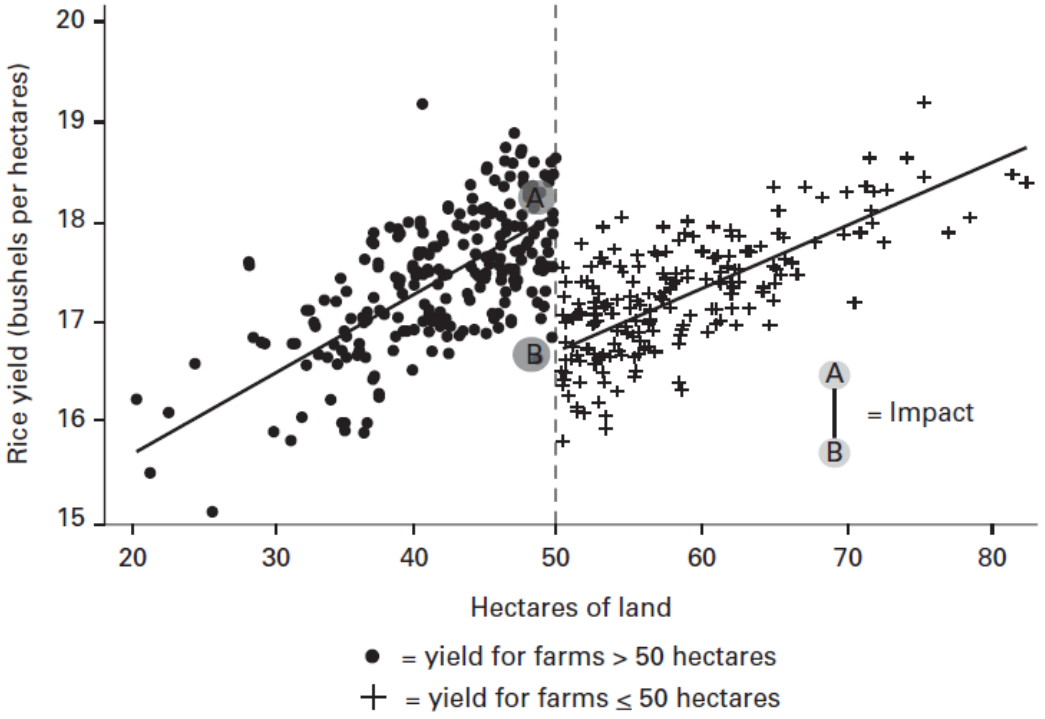


Figure 6.2 Rice Yield, Smaller Farms versus Larger Farms (Follow-Up)



Graph taken from Impact Evaluation in Practice, Second Edition, 2016

Cash Transfers and Women's Agency: Evidence from Pakistan's BISP Program

- **Motivation/Problem:** Cash transfer programs in developing countries aim to reduce poverty, support consumption, and improve human capital, often targeting women to enhance empowerment. This study examines the impact of Pakistan's Benazir Income Support Program (BISP) on women's agency after two and five years.
- **Intervention:** In 2010, Pakistan introduced a Proxy Means Test (PMT) to target BISP transfers to the poorest, replacing selection by local parliamentarians. Households scoring below 16.17 in the 2010–11 Poverty Scorecard survey qualified, with ever-married women holding a valid identity card eligible to receive benefits.
- **Methodology:**
  - The analysis combines household survey data from 2011, 2013, and 2016, specifically collected for the BISP evaluation. And administrative records on eligibility and payments

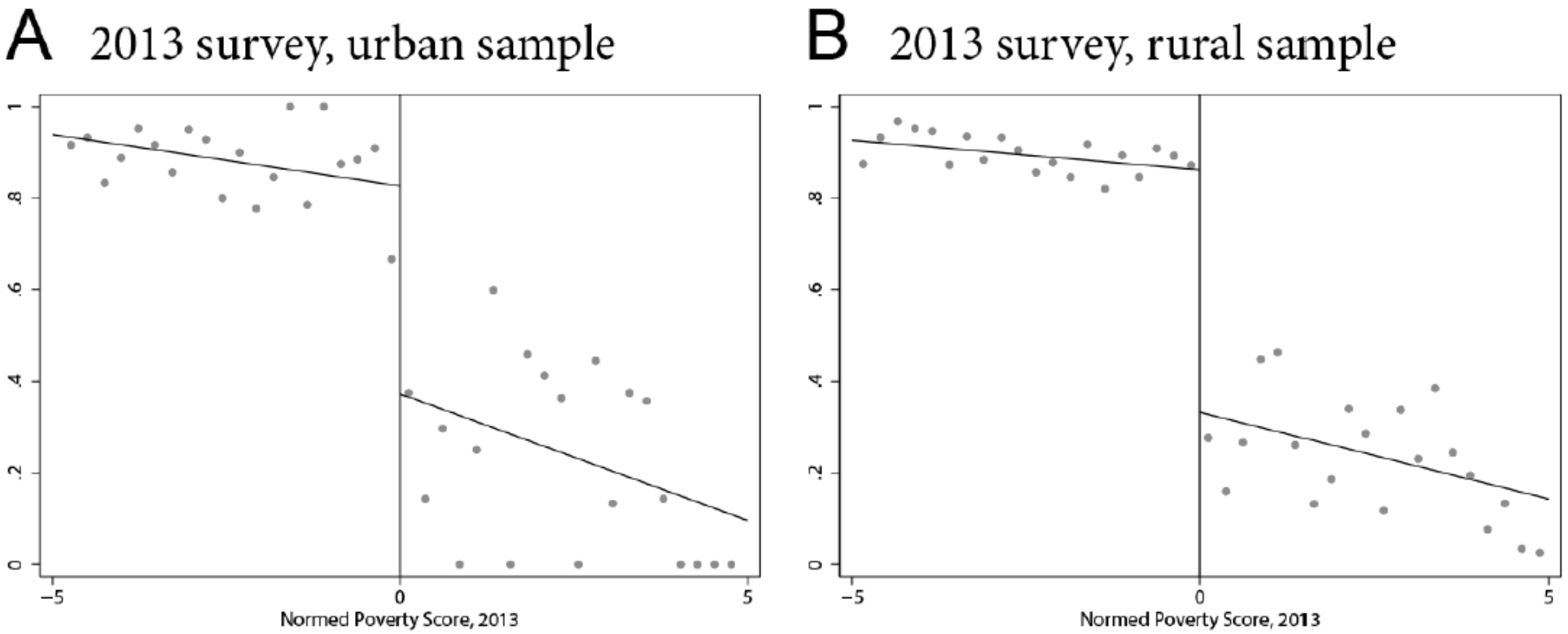
Ambler, Kate; and de Brauw, Alan. Cash transfers and women's agency: Evidence from Pakistan's BISP program. Economic Development and Cultural Change 72(3).

Cash Transfers and Women's Agency: Evidence from Pakistan's BISP Program

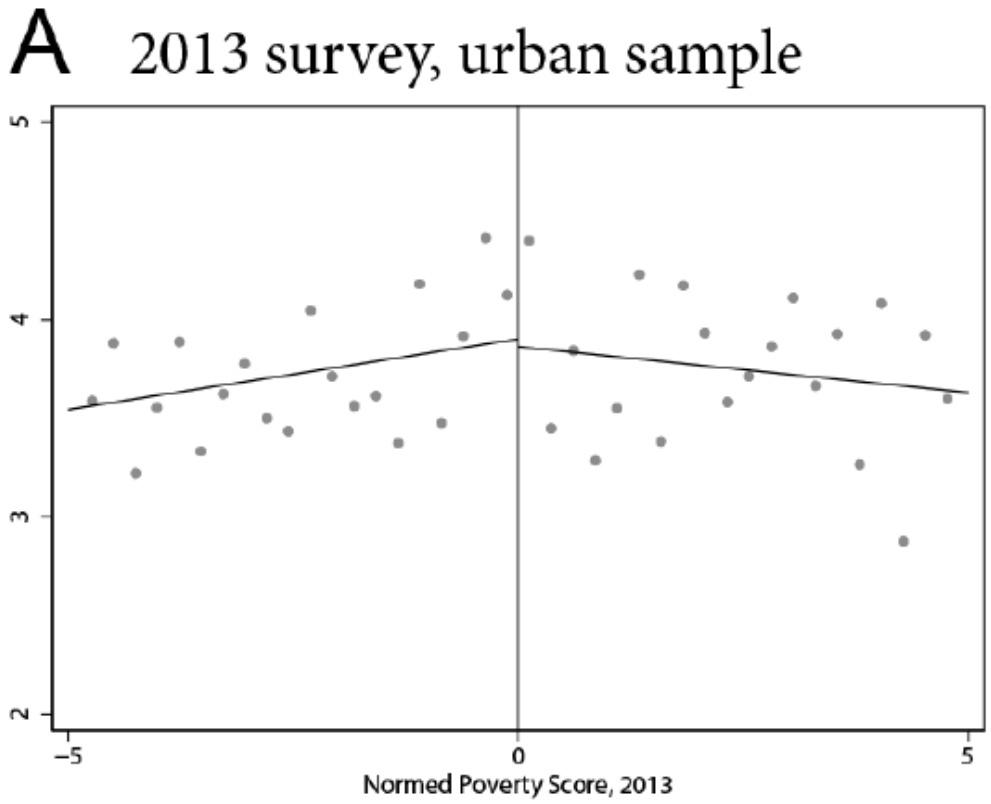
- **Methodology:**
  - The way BISP was targeted and designed allows for a causal identification through RDD, with households just above and below the eligibility threshold serving as comparison groups.
  - The key assumption is that eligible and ineligible households near the cutoff only differ through BISP eligibility, with no other programs targeting beneficiaries using the same poverty score.
  - RDD identifies program effects for households near the cutoff, using eligibility as an instrument for beneficiary status, with a fuzzy RDD estimate accounting for imperfect compliance.
  - The analysis combines household survey data from 2011, 2013, and 2016, specifically collected for the BISP evaluation. And administrative records on eligibility and payments

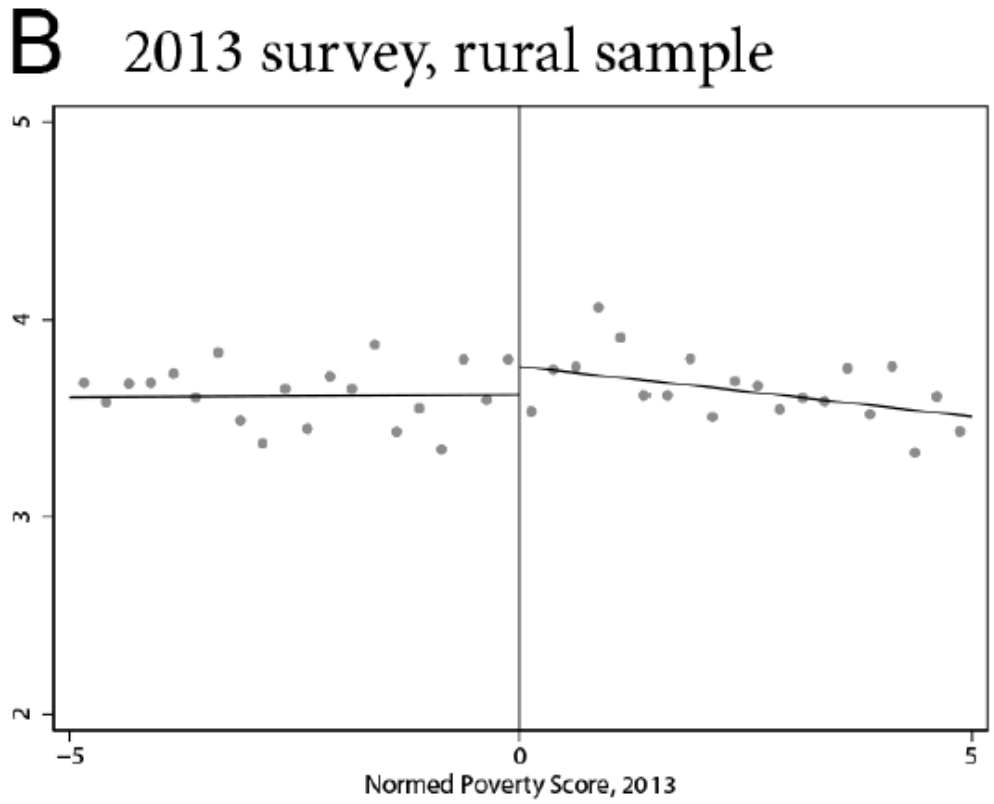
Ambler, Kate; and de Brauw, Alan. Cash transfers and women's agency: Evidence from Pakistan's BISP program. Economic Development and Cultural Change 72(3).

Relationship between poverty score and probability of receiving BISP transfers (*score normalized).



Relationship between gender-norms index and poverty score (*score normalized).





References

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- The elements of a randomized evaluation, JPAL https://www.povertyactionlab.org/resource/elements-randomized-evaluation
- Randomized Control Trials, DIME-World Bank https://dimewiki.worldbank.org/Randomized_Control_Trials
- Kumar, N., Raghunathan, K., Arrieta, A., Jilani, A., & Pandey, S. (2021). The power of the collective empowers women: Evidence from self-help groups in India. World Development, 146, 105579.
- Ambler, Kate; and de Brauw, Alan. Cash transfers and women's agency: Evidence from Pakistan's BISP program. Economic Development and Cultural Change 72(3).

Useful resources

- Power size calculations-DIME-World Bank
- Power size calculations-JPAL