Asian Development Bank - International Initiative for Impact Evaluation

Video Lecture Series

# Quasi-experimental methods for impact evaluations

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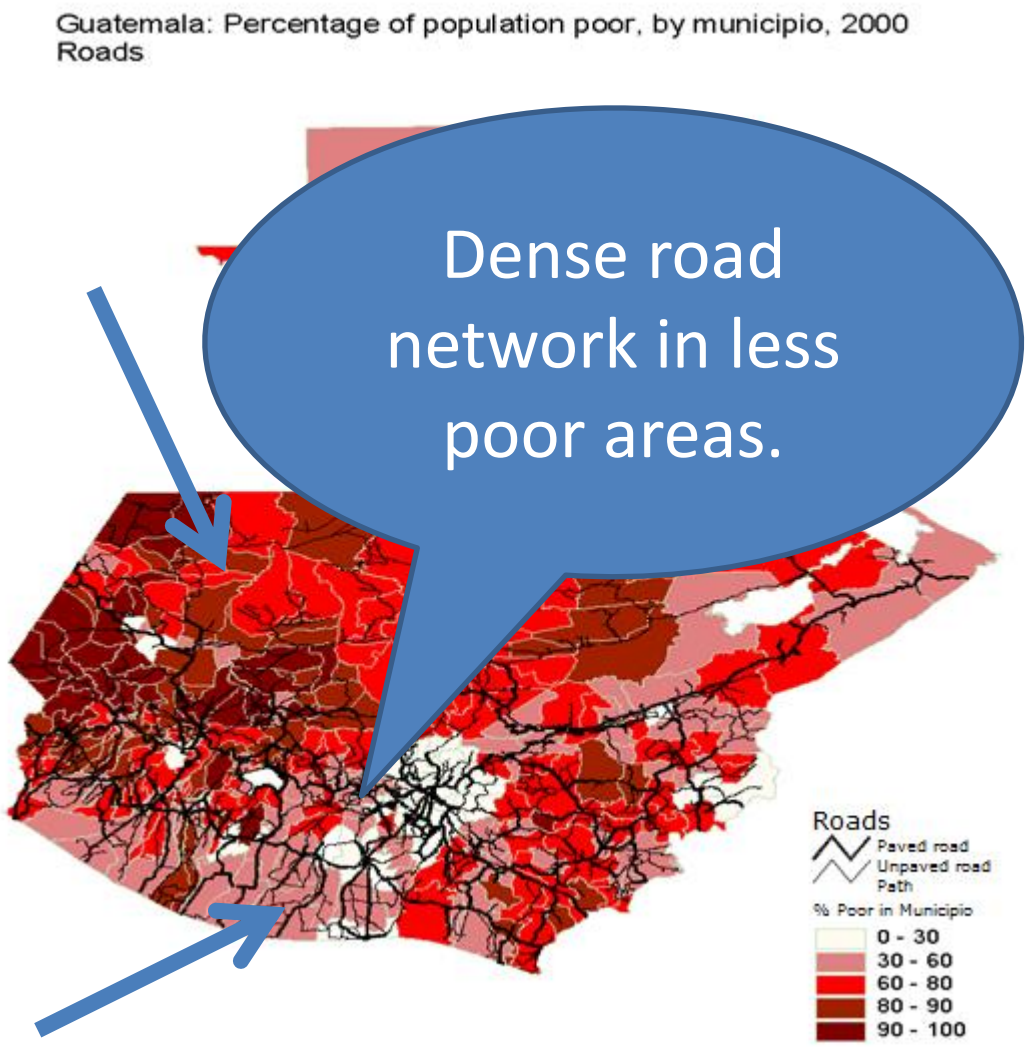
# The Case of Roads in Guatemala

- Roads provide access to markets, health services, schools. So they *MUST* make a difference
- Roads are likely to be placed in fertile and better off areas – risk of over-estimating their effects
- Problem of project placement
- So how *do you quantify the* impact?



# Random assignment

- Needs to occur before the programme
- Helps to deal with two main biases:
  - Self-selection bias
  - Programme placement bias
- Control for *unobserved characteristics* that may affect outcomes

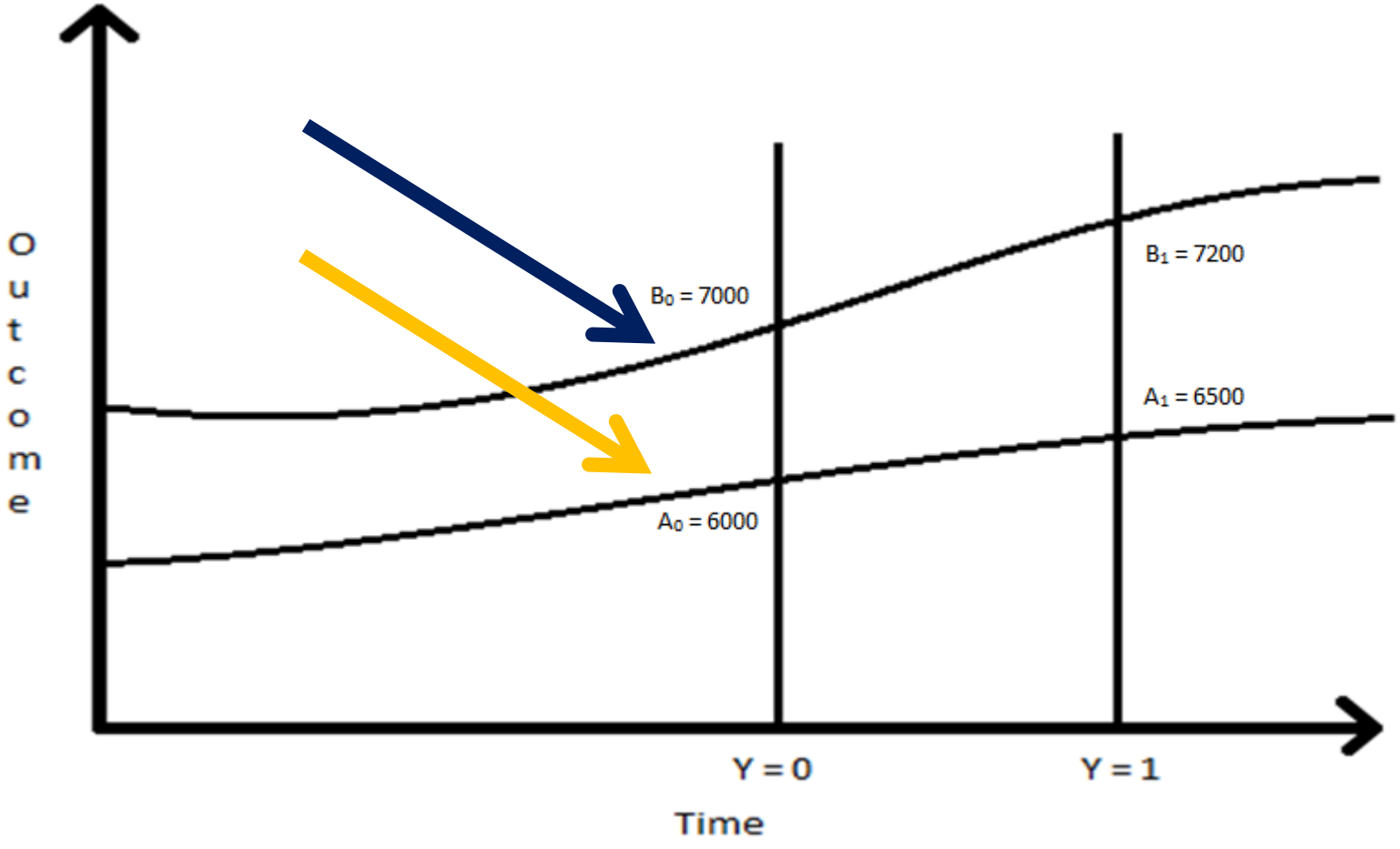
# USING QUASI-EXPERIMENTAL DESIGNS WHEN RANDOM ASSIGNMENT IS NOT POSSIBLE

# Three methods

- Regression discontinuity design
- Matching
- Instrumental variables

# MATCHING METHODS TRY TO MIMIC RANDOM ASSIGNMENT AND THEN USE DIFFERENCE-IN-DIFFERENCE

# Difference in Difference (DID)



# Difference in Difference (DID)

Outcome

Double difference =(6500-6000)-(7200-7000)=300

By itself DID is not sufficient to get rid of bias.

- Requires proof of similarity at the beginning (balance in level variables)

- Requires proof of balance in the way groups are changing in time (balance in trends)

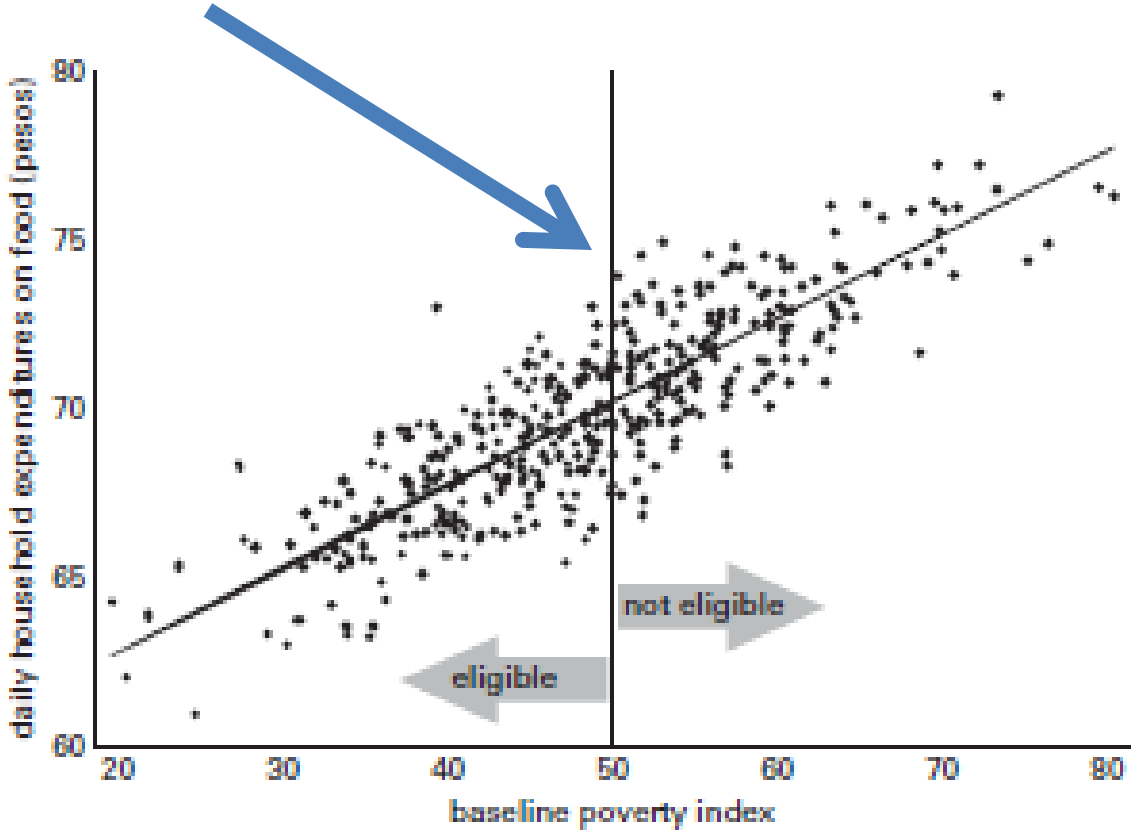
# Regression Discontinuity Design

Takes advantage of programme-imposed cutoffs that determines who receives the programme

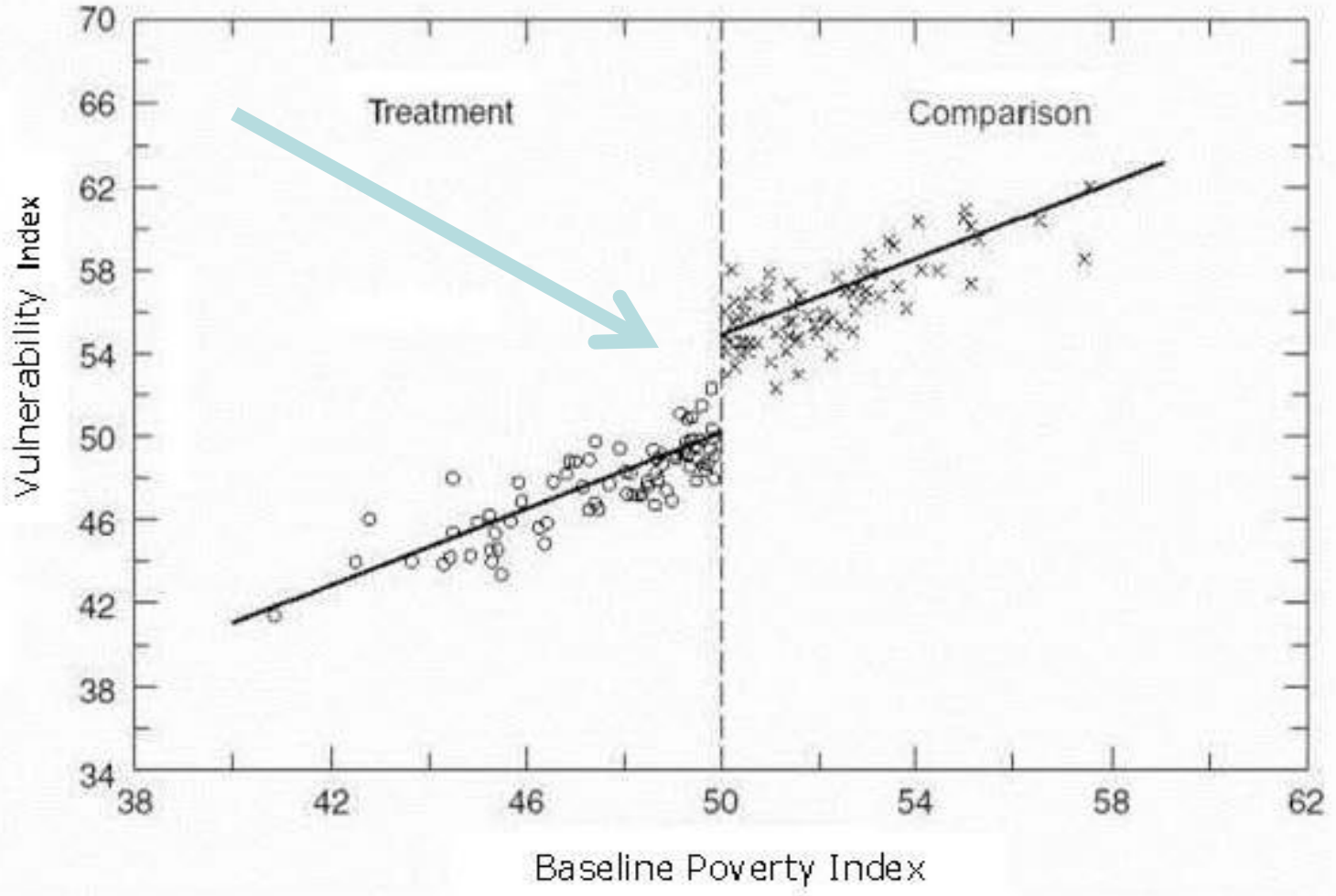
Around this cut-off there is little reason to think there are differences in unobservable characteristics between the two groups.

# Regression Discontinuity Design

Discontinuity in eligibility for Poverty Reduction Programme



# Measurement of Impact



# Matching (Propensity Score Matching)

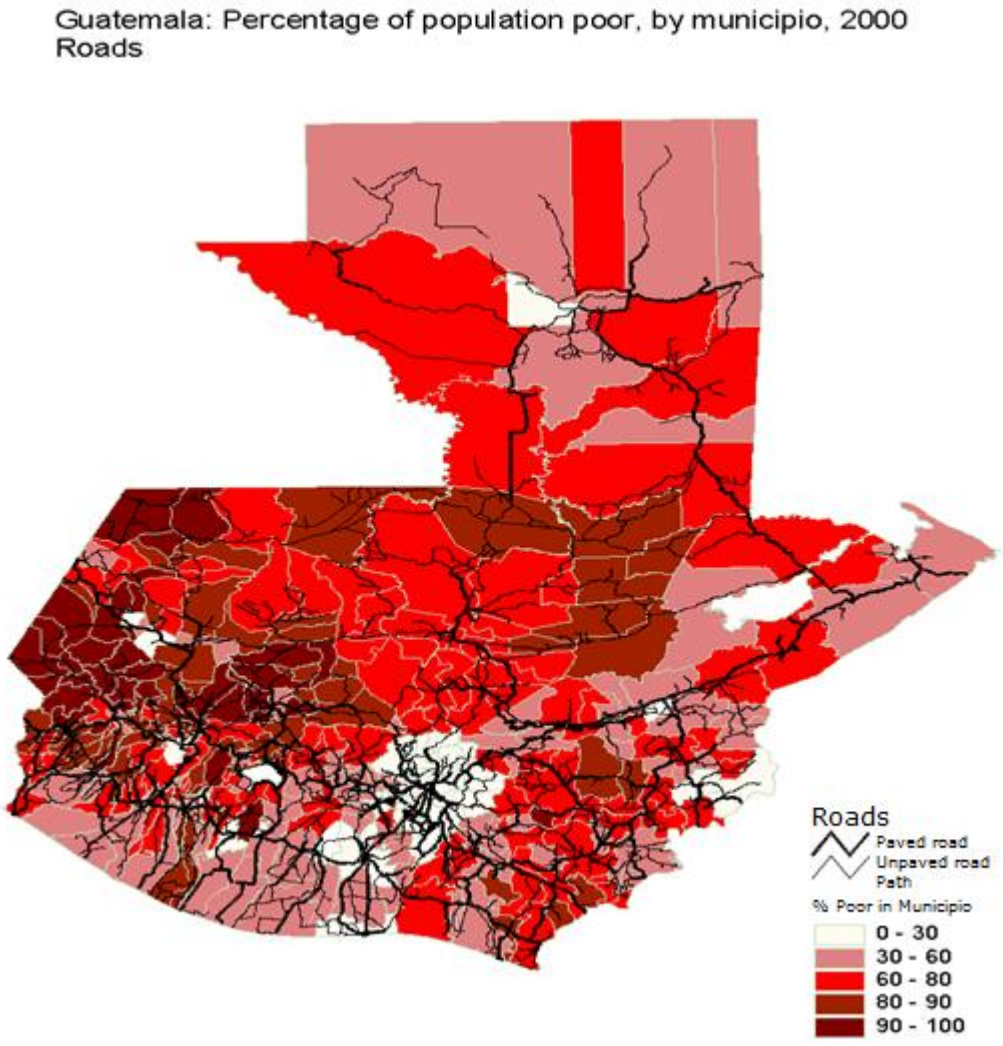
Matching essentially constructs an artificial comparison group that has the most similar characteristics possible as the treatment group.

# Matching Design

| Treated Units | | | |
|---|---|---|---|
| Age | Gender | Months Unemployed | Secondary Diploma |
| 19 | 1 | 3 | 0 |
| 35 | 1 | 17 | 1 |
| 41 | 0 | 17 | 1 |
| 23 | 1 | 6 | 0 |
| 55 | 0 | 21 | 1 |
| 27 | 0 | 4 | 1 |
| 24 | 1 | 8 | 1 |
| 46 | 0 | 3 | 0 |
| 33 | 0 | 12 | 1 |
| 40 | 1 | 2 | 0 |

| Untreated Units | | | |
|---|---|---|---|
| Age | Gender | Months Unemployed | Secondary Diploma |
| 24 | 1 | 8 | 1 |
| 38 | 0 | 2 | 0 |
| 58 | 1 | 7 | 1 |
| 21 | 0 | 2 | 1 |
| 34 | 1 | 20 | 0 |
| 41 | 0 | 17 | 1 |
| 46 | 0 | 9 | 0 |
| 41 | 0 | 11 | 1 |
| 19 | 1 | 3 | 0 |
| 27 | 0 | 4 | 0 |

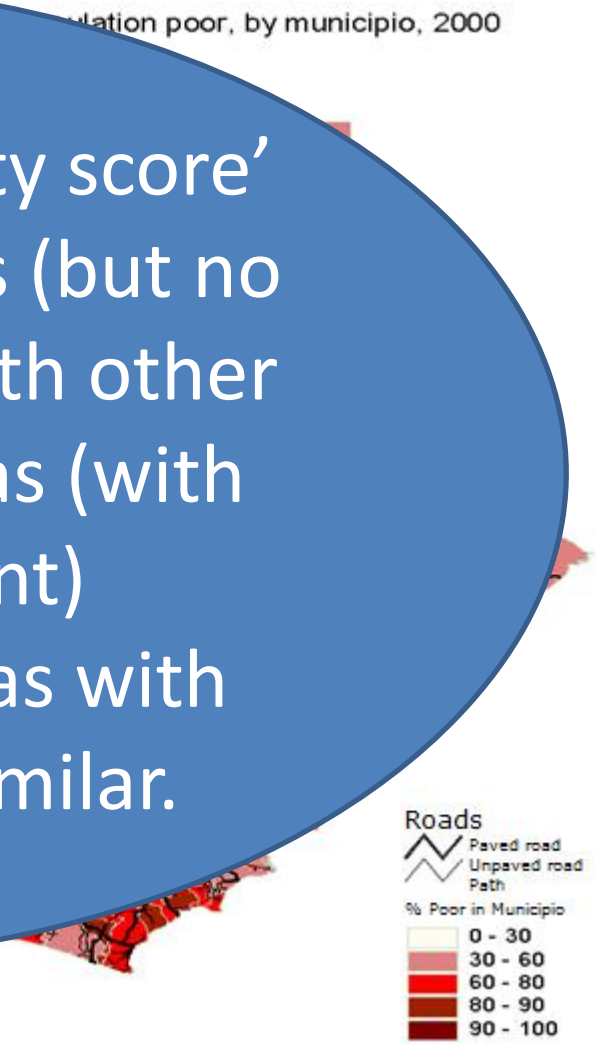
- Comparison groups created by calculating a likelihood
- Find ‘common support’
- Match the ones with likelihood to each other.



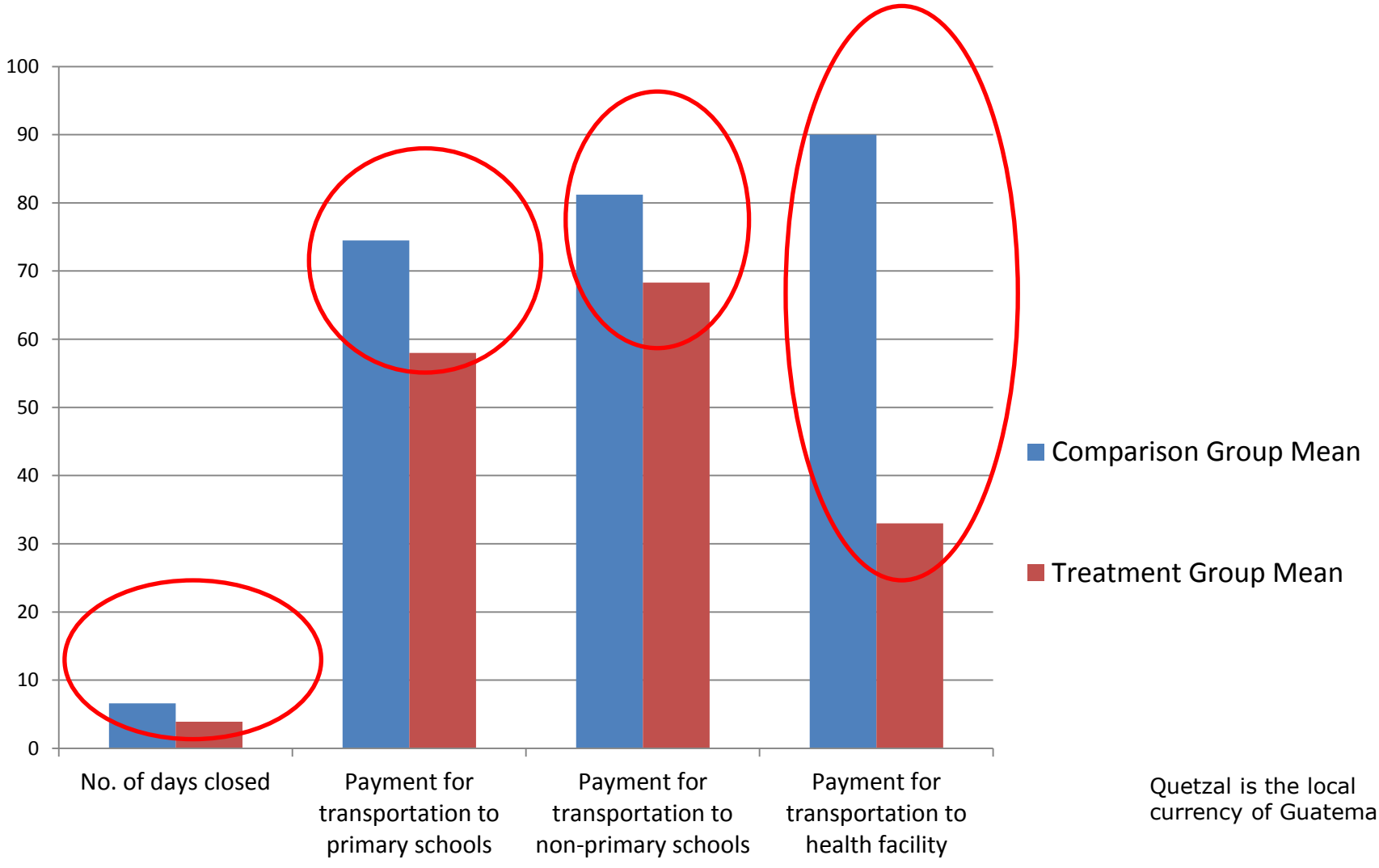
- Comparis
  create
  calc
  like
- Find
  suppo
- Match th
  with likelihood t
  each other.

Match using ‘propensity score’

- high likelihood areas (but no road investment) with other high likelihood areas (with road investment)
- Low likelihood areas with others that are similar.



# Findings: Impact of road related work on poverty related indicators




Quetzal is the local currency of Guatemala.

# Summary

- Quasi-experimental methods may be used for impact evaluations when random assignment is not possible.
- Quasi-experimental is only as robust as the data that are used for matching.
- The burden of proving that unobservable differences have been accounted for, to make 'treated' and comparison groups similar usually depends on the study authors.