

# Non-Experimental Impact Evaluations

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# Evaluation Designs

- Evaluation designs are determined by the choice of methods used to identify a comparison/control group, or in other words, a group of non-participants in a program or a project.
- This comparison/control group should be as similar to the target group as possible.
- An estimate of impact can then be derived by comparing the levels of well-being between comparison/control groups and the target group.
- Evaluation designs can be broadly classified into three categories:
  - Experimental
  - Quasi-Experimental
  - Non-Experimental
- These three evaluation designs vary in feasibility, cost, the degree of clarity and validity of results, and the degree of selection bias

# Evaluation Designs

## Experimental

- Randomly allocated set of individuals/other unit of analysis into: treatment vs control group
- Comparable treatment and control groups
- Free from the troublesome [selection bias](#) issues that exist in all evaluations.
- Generally considered the most robust methodology

## Quasi-experimental

- Matching or reflexive comparisons.
- *Matching* involves identifying non-program participants comparable in essential characteristics to participants.
  - Prospective and retrospective studies
  - Most widely used: propensity score matching
- In *reflexive comparison*: same participants before and after
  - Useful in evaluations of full-coverage interventions

## Non-experimental

- Can be used when it is not possible to do experimental or quasi-experimental design
- Participants can be compared to non-participants using statistical methods to account for differences between the two groups.
- Mostly used: Instrumental variables

# Experimental (Randomized)

## The main benefit:

- simplicity in interpreting results—the program impact on the outcome being evaluated can be measured by the difference between the means

While experimental designs tend to be considered the optimum approach to estimating project impact, in practice there are several problems:

- Randomization may be unethical
- Political reason : control group will not receive benefit
- The scope of the intervention
- Individuals in treatment or control groups may change certain identifying characteristics
- Difficult to ensure that assignment is truly random.
- Expensive and time consuming, particularly in the collection of new data.

# Quasi-experimental

## The main advantage:

- *Matching:*
  - Can draw on existing data sources > quicker and cheaper

## The principal disadvantages:

- *Matching:*
  - the reliability of the results is often reduced, selection bias is not completely removed
  - matching methods can be statistically complex
- *Reflective comparison:*
  - Change in participants situation may be affected by many reasons

# Non-Experimental

## The main benefit

- relatively cheap and easy to implement since it can draw on existing data sources.

## A number of difficulties:

- the reliability of results is often reduced as the methodology is less robust statistically
- has some statistical complexities
- full correction of selection bias remains as a challenge

# Reference

- <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTISPMA/0,,contentMDK:20188242~menuPK:412148~pagePK:148956~piPK:216618~theSitePK:384329~isCURL:Y,00.html>

# Impact Evaluation in Practice



# Evaluating Impact of Kredit Usaha Rakyat (KUR)

- KUR is one of government programs to improve access of businesses that feasible but unbankable to get credit from bank
- This is a credit guarantee scheme, in which the government pay the insurance fee of the credit so that micro businesses that apply loan do not need to provide additional collateral other than their prospective business to the bank
- KUR has been established since 2007
- Questions that need to be answered:
  - Is government “investment” in KUR worth it?
  - What are the impacts of KUR for the microbusiness development and welfare of people who run and work in micro business?

# Challenges

- Selection Bias :
    - People select themselves to apply loan
    - The same unobserved characteristics that make them apply loan might have influence their business outcomes >>> Impact might be overestimated
- >>> Then.... Should do Randomization!
- However... Funding for KUR is coming from the bank >> Bank prefer to have “good” clients rather than bad clients
- >>> Quasi-Experimental or Non Experimental Impact Evaluation
- Let’s look at what kind of Data Available?
- Borrower data from Bank > Truncated, can’t established control
  - Susenas > has specific question on KUR > Can compare those who get KUR and who do not get KUR > *reverse causality* and no business outcomes
- >>> try to look at other data set

# Using Non-Experimental Impact Evaluation : An Example

# Does Receiving Formal Loan Increase Production?

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# Outline

- Motivation and Research Questions
- Data and Methodology
- Results and Discussions
- Conclusion and Policy Recommendation

# Motivation and Research Questions

# Motivation

- Lack of financial capital is often cited as the biggest barrier in micro and small businesses
- Is it the case that when businesses receive credit then they can develop?
- Evaluate the impact of access to credit is challenging, due to the possibility of self selection problem
- Estimation without take into account the self selection problem will be biased.

# Research Questions

- Do entrepreneurs self select themselves when they apply formal loan?
- What is the impact of formal loans to firms' production?



# Data and Methodology

# Data

- Micro and Small Industries Survey (VIMK) 2010
- Collected by Statistics Indonesia (BPS)
- 59,657 respondents
- Representative at the national level

# Data Description

- VIMK data that is being used is limited to firm owners/managers with the following criteria :
  - Sole proprietorship
  - Entrepreneurs at productive age: 17-65
  - Entrepreneurs who started their business at 15 years old
  - Sample in this study 49,438 business or 82.87% of the full samples collected in VIMK 2010.
- Data from PODES 2011 on availability of financial institutions and the distance from village office is included for producing exogenous variables.

Table 1. Descriptive Statistics

Variable	Borrow Formal		Do Not Borrow		Diff.
	Mean	Std. Dev.	Mean	Std. Dev.	
Micro Business	0.67	0.47	0.91	0.29	-0.23***
Total Labor	4.86	4.19	2.42	2.18	2.44***
Male Owner	0.80	0.40	0.59	0.49	0.21***
Age	43.65	9.30	43.48	10.07	0.17
Experience	12.09	8.98	12.97	9.71	-0.88***
<i>Education</i>					
No Education	0.13	0.34	0.22	0.42	-0.09***
Primary School	0.31	0.46	0.40	0.49	-0.09***
Junior High School	0.21	0.41	0.19	0.39	0.03***
Senior High School	0.29	0.46	0.17	0.37	0.12***
Higher Education	0.06	0.23	0.02	0.14	0.04***
<i>Biggest Challenge</i>					
Supplies	0.16	0.37	0.16	0.37	0.00
Marketing	0.20	0.40	0.21	0.40	-0.01
Capital	0.39	0.49	0.33	0.47	0.06***
Fuel Problem	0.02	0.16	0.01	0.10	0.01***
Transportation	0.01	0.09	0.02	0.13	-0.01***
Skills	0.02	0.15	0.02	0.14	0.00
Labor Cost	0.01	0.08	0.01	0.08	0.00
Others	0.06	0.23	0.05	0.22	0.01
<i>Market</i>					
Within Districts	70.81	37.78	86.71	29.37	-15.90***
Within Province	20.22	31.06	10.16	25.00	10.07***
Inter Provinces	7.27	21.43	2.58	13.57	4.70***
Export	1.69	12.34	0.56	7.19	1.14***
Having Expansion Plan	0.68	0.47	0.44	0.50	0.24***
Observation	3654		37847		

\* p&lt;0.05, \*\* p&lt;0.01, \*\*\* p&lt;0.001

# Methodology (1/2)

- This paper proposed to use switching regression method to identify the causal relationship between access to formal loans and production
- Switching Regression
  - the model take into account unobservable characteristics that drive self selection
  - This advantage of controlling for unobservable factors cannot be found in other estimation such as the propensity score matching and Heckman selection or instrumental variable approaches
- In the endogenous switching model, there are two steps of regressions:
  - the selection regression,
  - second, the outcome equation

# Methodology (2/2)

- The Selection Equation

$$I_i^* = Z' \alpha_i + \mu_i$$

$$I_i = 1 \quad \text{if } I_i^* > 0$$

$$I_i = 0 \quad \text{if } I_i^* \leq 0$$

- In the outcome regressions, a separate estimation of production function is specified as:

$$Y_{1i} = \beta_1 X_{1i} + \varepsilon_{1i} \quad \text{if } I_i = 1$$

$$Y_{0i} = \beta_0 X_{0i} + \varepsilon_{0i} \quad \text{if } I_i = 0$$

# Results and Discussions

Table 2. The Selection Function

Independent Variables	Coefficient
Male	0.227*** (7.47)
Primary Education	-0.251*** (-9.14)
Years since established	-0.0000199 (-0.02)
Micro Size Business	-0.537*** (-12.48)
Jawa and Bali	0.0390 (1.08)
Distance of Village from Banks	-0.0127*** (-5.35)
Constant	-0.646*** (-11.25)
Observation	33674

t statistics in parentheses

\* p<0.05 \*\* p<0.01 \*\*\* p<0.001



Table 3. The Production Functions

Independent Variables	Coefficient	
	Non-Applicants	Applicants
Fixed Asset (ln)	0.0380*** (6.93)	0.0430*** (4.35)
Supplies (ln)	0.297*** (11.23)	0.501*** (11.44)
Total Labor Cost (ln)	0.0697*** (21.70)	0.0417*** (11.51)
Male	0.524*** (15.29)	0.586*** (10.59)
Primary Education	-0.140*** (-5.58)	-0.405*** (-9.12)
Years since established	-0.00698*** (-6.58)	0.00133 (0.72)
Micro Size Business	-0.240*** (-4.99)	-0.894*** (-12.05)
Jawa and Bali	-0.129*** (-4.07)	0.0653 (1.37)
Apply but Rejected		-0.0874* (-2.06)
Constant	9.790*** (26.10)	5.840*** (9.96)
$\sigma$	-0.0194 (-0.92)	0.309*** (6.62)
$\rho$	-1.492*** (-30.50)	1.972*** (20.19)

t statistics in parentheses

\* p&lt;0.05 \*\* p&lt;0.01 \*\*\* p&lt;0.001

# Results and Conclusion

- Many previous studies evaluating the impact of credit on poverty status.
- Very little research on the impact of the microcredit to the their client production (output)
- We found indicative evidence of self-selection among the non-applicants, had they apply loan they might end up with lower production value.
- Credit will work best for firm managers who have specific characteristics; comparative advantage
- Advocating credit access should be accompanied by more investments in improving their capacity of production
- Goal: closing the gap between borrowers and non borrowers. Ensure productive credit.

Thank you!