เครื่องมือทาง**เศรษฐศาสตร์** กับการออกแบบ**นโยบายสาธารณะ** 

โสมรัคมิ์ จันทรัตน์

จากรางวัลโนเบลสาขาเครษฐศาสตร์ ปี 2562 สู่การใช้นวัตกรรมทางเครษฐศาสตร์ เพื่อลดความเหลื่อมล้ำทางการศึกษาและพัฒนาทรัพยากรมนุษย์ในประเทศไทย 1 พอตวิดวะมา 2542



PUEY UNGPHAKORN INSTITUTE FOR ECONOMIC RESEARCH

#### Impact on Test Scores (in SD), with 90% Confidence Interval



Impact

90% Lower Bound

90% Upper Bound

Unconditional cash transfers, Malawi (4) Minimum conditional cash transfers, Malawi (4) Girls merit scholarships, Kenya (8) Village-based schools, Afghanistan (10) Providing earnings information, Madagascar (16) Reducing class size, Kenya (20) Textbooks, Kenya (23) Flipcharts, Kenya (24) Reducing class size, India (21) Building / improving libraries, India (36) School committee grants, Indonesia (25) School committee grants, Gambia (37) Textbooks for top quintile, Kenya (23) Adding computers to classrooms, Colombia (27) One Laptop Per Child (OLPC), Peru (26) Diagnostic feedback, India (39) Read-a-Thon, Philippines (38) Individually-paced computer assisted learning, India (21) Extra contract teacher + tracking, Kenya (19, 20) Remedial education, India (21) Tracking by achievement, Kenya (19) Contract teachers, Kenya (20) Teacher incentives (year 1), Kenya (30) Teacher incentives (long-run), Kenya (30) Camera monitoring, India (28) Teacher incentives (year 2), Kenya (30) Training for school committees, Indonesia (25) Grants & training for school cmte, Gambia (37) Electing school cmte & linking to local govt, Indonesia (25) Linking school cmte to local govt, Indonesia (25)

Kremer et al. 2013

0.01 0.1 1 10 100 = 00

Additional SD per

\$100 (Log Scale)

## Evidence based policy making: Why?





Evidence based policy making in the policy process



3/16



## Evidence based policy making & Economic tools

Casual

inference

# Policy question



Data

Macro/microST/LT

- Mechanism
- Existing
- Hypothesis Need to collect
- Difference in difference
- Instrumental variable
- Regression discontinuity
- Matching
- Randomization
- Structural modeling
- Big data & mixed model



## Casual inference Main but <u>challenging</u> job for economics

Challenges in measuring impact of program on outcome(s)



X (After) – (Before): Impact = b - a but...other things also happen during the time?
X (In program) – (Not in program): Impact = d - b but...are control and treatment different even before the program? → selection problem







### If data before and after program available Difference in difference

• Compare changes in outcomes over time between treatment and control groups

	After	Before	Difference	
In school	b	а	b-a	
Not in school	d	С	d-c	
Difference	b-d	a-c	(b-a)-(d-c)	

<u>Correct</u> for initial difference of treatment and control groups

<u>Assume</u> both groups move with similar time trend without program

But...do control and treatment change with same time trend?

6/16





## If data before program NOT available Instrument variable (IV)

• Find instrument that are not related to outcome but can induce subject into treatment/control groups

Correct for initial difference of treatment and control groups

- Ex) Angrist (1990) estimate impacts of military service on labor outcome
  - IV: draft lottery
- Ex) Angrist and Krueger (1991) estimate effects of compulsory school on earnings
  - IV: quarter of birth in the census

(In the US, students can enter school when they turn 6 in Jan and have to stay in school until they reach 16)



Rice yield after the program



### If data before program NOT available Regression discontinuity

Compare control and treatment within the neighborhood of eligibility threshold

<u>Correct</u> for initial difference of treatment and control groups

<u>Assume</u> subjects cannot manipulate their eligibility ... but







### Propensity score



## If data before program NOT available Matching

• Construct control group that have statistically similar to treatment based on observed characteristics

<u>Correct</u> for initial difference of treatment and control groups

<u>Assume</u> sorting based on observed characteristics

But...how can we be ensure that control and treatment are not different based on unobserved characteristics?





### If new data collection is possible Randomization

0/16

• Pure randomization: Randomly assign subject to program (treatment) and control group

**Correct** for initial difference of treatment and control groups





# If new data collection is possible Randomization

Ex) Behrman et al.(2005) evaluate Progressa CCT program

- Randomly select villages in treatment and controls
- Compare eligible households in control and treatment groups





## Other method and the use of big/admin data

### • Structural modeling:

- 1) develop model and calibrate with data with good variations
- 2) simulate what would happen to outcome with policy options

### Ex) Townsend evaluate Thailand village funds

- Big/admin data: ex) researchers in the US have been exploiting census data
- 1) Cover before and after program
- 2) track for long-term outcomes
- 3) large coverage  $\rightarrow$  external validity and impact heterogeneity

### Ex) Duflo 2001, Chetty's work with tax records, etc.



### Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence from an Unusual Policy Experiment

By Esther Duflo\*

Between 1973 and 1978, the Indonesian government engaged in one of the largest school construction programs on record. Combining differences across regions in the number of schools constructed with differences across cohorts induced by the timing of the program suggests that each primary school constructed per 1,000 children led to an average increase of 0.12 to 0.19 years of education, as well as a 1.5 to 2.7 percent increase in wages. This implies estimates of economic returns to education ranging from 6.8 to 10.6 percent. (JEL I2, J31, O15, O22)

### Duflo's famous paper using Indonesia Census

	Years of education Level of program in region of birth			Log(wages) Level of program in region of birth		
Birthplace						
Birthday	High (1)	Low (2)	Difference (3)	High (4)	Low (5)	Difference (6)
Panel A: Experiment of Interest						
Aged 2 to 6 in 1974	8.49 (0.043)	9.76 (0.037)	-1.27 (0.057)	6.61 (0.0078)	6.73 (0.0064)	-0.12 (0.010)
Aged 12 to 17 in 1974	8.02 (0.053)	9.40 (0.042)	-1.39 (0.067)	6.87 (0.0085)	7.02 (0.0069)	-0.15 (0.011)
Difference	0.47 (0.070)	0.36 (0.038)	0.12 (0.089)	-0.26 (0.011)	-0.29 (0.0096)	0.026 (0.015)





## Choosing economic tools to do evidence based policy

Casual

inference

## Policy question

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