AFTER DATA: DEMYSTIFYING TREATMENT EFFECTS OF AN INTERVENTION

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Aid Talk



Salvation?

Additional Years of Participation per \$100 Spent

20.7	13.9	0.71	0.27	2.7	0	0	0	0	3.1	0.03
Information on Returns to Education, for Parents	Deworming Through Primary Schools	Free Primary School Uniforms	Merit Scholarships for Girls	Iron Fortification and Deworming in Preschools	Camera Monitoring of Teachers' Attendance	Computer-Assisted Learning Curriculum	Remedial Tutoring by Volunteers in India	Menstrual Cups for Teenage Girls in Nepal	Information on Returns to Education, for Boys	PROGRESA CCT for Primary School Attendance
Africa				South Asia				Latin America		

An important nuance

- Difference between the scientific question of what education does vs. what programmatic offering of training does
- They are not the same
- Why is it important?

A Primer on Economics of Education

Economics of education (interventions)

- Education Premium = (Earnings from training)
 - Earnings from other (best) option)

- Upfront cost of training

- Net earnings may vary between individuals
- Education/training interventions often involve varying (lowering) the cost of training

Leading a horse to water!



Basic Problem of Evaluation

The problem of missing observations



Solutions require assumptions



[Y^C(Treated) - Y^C(Control)]

What would happen to both groups if there were no interventions?

BIAS

Why $Y^{C}(Treated) \neq Y^{C}(Control)$?

Sources of bias:

Selection:

Training is offered to less able/more disadvantage people <u>Omitted</u> <u>Variable(s)</u>:

Offered Training will be taken up by more able people <u>Reverse</u> Causality:

Higher expectations in salary will motivate people to take up costly trainings

Practical Issues in Data Generation

Data Generation Process



Estimating Intent-to-Treat Effect

Difference of the first kind: I T T

What is intent-to-treat (ITT) difference (as a measure of treatment effect)?

The Game Plan



Example: Promoting Promotion of Female Line-Operators to Supervisor through Off-Factory Training

- While women make about 90% of the RMG workers, very few (about 5-10%) are employed as managers (e.g. sewing section supervisors)
- □ Is lack of training a barrier?
- OR at least can it be use as a nudge to try women out as sewing section supervisors?
- We provided 6-week training outside the factory?
- We have some data for 10 months after the training. Let's analyze that.

Example: Promoting Promotion of Female Line-Operators to Supervisor through Off-Factory Training



Example: Promoting Promotion of Female Line-Operators to Supervisor through Off-Factory Training

		Ν	Salary (BDT/Month)
(Complying) Control			- 5,279
All Trainees (available for follow-up))	203	7,322
Promoted to Supervisor		143	9,025
Line-Operator not promoted		80	4,941
Not available for follow-up		54	Ś

Intent-to-Treat Effect = 7,322 - 5,279 = 2,043

Why or when is it important?

- Obviously, not everybody who received training was promoted
- But the program (or the society) still spent money on them
- So Cost-Benefit/Effectiveness Analysis should take that into consideration
- Hence ITT is <u>essential</u> for program evaluation

Cost-Effectiveness Analysis for Female LO-to-SV Training Program

- \Box Again, ITT = 2,043 BDT/Month
- Upfront Cost of the Training = 40,000 BDT
- Opportunity Cost (@5,000 BDT/month) = about 8,000 BDT
- About 24 months to recuperate the fixed cost of training
 - About 12 months conditional on the promotion

How about effect on the compliers?

The Idea

Impacts may be distributed in different ways



- Both cases 1 and 2 have the same ITT effects.
- However, the impact is larger among the
 - "compliers" in Case 1.
- Relevant for low cost "encouragement" based interventions

Example: Promoting Promotion of Female Line-Operators to Super-Visor through Off-Factory Training

		N	Salary (BDT/Month)				
(Complying) Control	·	-125	- 5,279				
All Trainees (available for follow-up)		203	7,322				
Promoted to Supervisor		143	9,025				
Line-Operator not promoted		80	4,941				
Not available for follow-up		54	Ś				
Treatment Effect on the Promotees $= 9,025 - 5,279 = 3,746$							

Heterogeneity

A Story

- What if we form community development workers and make local women leaders aware of them?
- Is there any difference in the management practices of these leaders?
 - E.g. Did they really interact with the community women groups?



Engagements with CWGs Stratified for FLGMs...





In an experiment, subjects will do whatever fits them the best.

Example: Classroom based Education Remedial Program

- Think about providing remedial education to children from underprivileged households who are mobile than the average population (e.g. households living in urban slums)
- We also consider that not all children are alike.
- In particular, there are <u>more</u> and <u>less</u> able children (perhaps already predetermined by socio-economic background).

Ideal case



Case 1: Remedial education keeps the weak students in school



Case 2: ... additionally the better students leave from the treatment classroom



Solutions

- More careful survey design
- More timely survey more delayed follow-up may lose more subjects
- Design of the interventions may also be helpful e.g. if interventions for the control group are delayed randomly, it may reduce attrition

However, anticipation may also bias the results

- Introduction of tracking protocols (e.g. phone numbers, GIS information)
- Others?

Spill-over...

... or how we learn social experiments are almost never self contained!

Example: School based Deworming



School #1

Some students within the same school are given the vaccination against worm infestations

- We may vaccinate individual students <u>within</u> a school
- However, non-vaccinated students may have significant <u>positive</u> spill-over
 Hence, any within school <u>between</u> student comparison will **underestimate** the true impact of the program

Clustering to avoid Spill-overs

Intervention at a <u>higher</u> level



- The treatment is carried out at the school level
- Some schools receive the deworming program, others do not
- All the analyses are carried out at the school level

Clustering and Power of an experiment

- Clustering comes with a cost: each observation is not independent anymore
- We have to explicitly consider how agents interact with each other within a unit of interventions (e.g. schools)
 - Intra-cluster Correlation





Spill-over through Price Effects

General Equilibrium Impact

- The interventions may change both good and factor market equilibriums
- Especially important when program is meant to be scaled up
- Prices may change because of shift in either demand or supply
 - E.g. college premium was associated with babyboomers getting college degrees en masse.
- Important channel by which non-participants may be affected

Case Study: Progresa

- Probably one of the largest cash transfer programs <u>conditional</u> on school participation
 - It is large (55% households from the 320 treatment villages)
 - It is substantial (each household received 20% of its income on average)
- Hence, it may allow us to estimate some of the spillover effect channeled through market interactions (so called GE effects)

Analysis



May underestimate the total social impacts of the program



Some words of caution

- RCT based program
 evaluations are
 considered gold
 standard.
- However, it is credible and acceptable only if it is done right.
- Random assignment is necessary but almost never sufficient for a rigorous evaluation.



Thank you.

Please email me with any questions/queries/ suggestions/ideas at: atonu.rabbani@gmail.com