Complex settings and impact evaluation: some reflections

David A. Raitzer, Economist, Economic Research and Regional Cooperation Department, ADB
What is a “complex setting”?

- Complexity is often defined as the presence of multiple components interacting in multiple ways (Johnson 2009, Johnson 2001, etc.)
  - Often with emergent (and often unpredictable) properties
- This presentation will be about **impact evaluation** in (as) complex settings.
  - Impact evaluation as empirical estimation of the treatment effects of interventions and their statistical significance.
- A complex setting for impact evaluation is not just when interventions are complex!
  1. Complexities of impact pathways
  2. Complexities of without project situation
  3. Complexities of impact evaluation implementation
  4. Complexities for causal inference
  5. Complexities of interpretation
Complexities of interventions

• Compound interventions and projects with many components
  • Problem: Treatment effect of what? Where is emergence expected?

• Solution: Clear permutations
  • Example: ADB Myanmar Climate Friendly Agribusiness Value Chains Sector Project – includes seed farms, rural roads, land use planning, irrigation, digital finance, processing improvements, sustainability certification, extension, climate advice, and more.
  • Approach: Focus on selected component permutations in randomized experiment

300 villages, 5000 households

- Irrigation
  - +Advisory services
- Credit
  - +Advisory services
- Control
  - Only
Problem: even “easy to evaluate” interventions can have complex impact pathways

Solution: Focus on defining the theory of change, planning for multiple hypothesis testing, subgroup analysis

Caveat: Relax pressure to avoid “data mining”, update questions
Problem: Tendency to think of impact evaluation as simple

Policymakers:
- Project (implement things)

Researchers:
1. Find an interesting question
2. Find an interesting project
3. Define treatment and comparison/control groups
4. Do a baseline survey
5. Do an endline survey
6. Run the data and write a paper
Impact evaluation conduct in a project is often complex – the *simple case*. 
Impact evaluation conduct in a project is often complex – a more realistic case
Shortcut of researchers is often to have an NGO do implementation of an experiment

- This reduces execution complexity, but introduces potential bias.
- Programs at scale by governments ≠ pilots by NGOs

Source: Usmani, Jeuland, and Pattanayak 2018
Complexities of without project scenarios

• Tendency to think of projects in a vacuum, so that project is only source of intervention
• But many agencies are often doing the same thing!
• And building on one another!
• A given project is really only partially altering the probability of treatment => an “encouragement” at best
• Solution can be to consider intervention, rather than project
• Allows reduced reliance on single project implementation

Example: Interventions evaluated

1. Membership in agricultural group/cooperative (conditional on no support)
2. Conditional on membership (vs no support)
   i. Any support
   ii. Credit
   iii. Training
   iv. Inputs
   v. Fixed assets (+ training)
   vi. Marketing (+ training)
Complexities of effects

• Problem: treatment effects differ, interact, evolve
  • Spillover effects
  • Placebo, John Henry, Hawthorne effects
  • Treatment effect on the treated vs. (sample) average treatment effects
  • Average vs. local effects
  • Time variant effects
  • Subgroup varying effects
  • Conditional effects
  • Multidimensional variation (e.g. subgroup effects over time)

• Solutions: embrace and explore the complexity
  • Designs appropriate to measure spillovers
  • Placebos
  • Post endline resurveys
  • Subgroup interaction terms
  • Quantile treatment effect procedures (e.g. via recentered influence functions)
  • Marginal treatment effects

Source: Brave and Wallstrum 2014
Takeaways

• Impact evaluation is riddled with complexities – even if the intervention seems “simple”

• Often too little attention to the complexities of impact evaluation conduct

• New tools allow for complexity to be better managed

• Complexity is also opportunity
  • Can allow for more impact evaluation options
  • Allows for revealing a much richer range of effects and insights