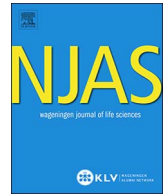




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Research paper

Diagnostics and field experiments

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ABSTRACT

Field experiments have been embraced in development economics and political science as a core method to learn what development interventions work and why. Scientists across the globe actively engage with development practitioners to evaluate projects and programmes. However, even though field experiments have raised the bar on causality, they are often too narrowly defined and lack focus on structural development problems. Researchers and development practitioners should do more to improve the diagnostic process of the problem under study. Rodrik's (2010) diagnostic framework provides a useful tool to improve the design and relevance of field experiments. Specifically, more should be done to seek coordination across studies, broaden the scope for interdisciplinary collaborations and seek peer review to increase validation and verification of evaluations. Only then can we increase knowledge aggregation and improve development policy making.

1. Introduction

Increasing African incomes remains high on the policy agenda. While over past decades some countries have been able to move up the development ladder, others remain stagnant with high levels poverty, mortality and food insecurity. Key constraints involve the absence or poor functioning of input and output markets, high transportation costs, and unfavourable biophysical conditions. Inspired by the success of the Green Revolution in Asia, a key development strategy has been to focus on the transfer of knowledge and technology to lift the African continent out of poverty. However, the success of these programs has been limited. For example, while technologies to improve yields and input-output convergence are available at a low cost, adoption and diffusion remains limited (Foster and Rosenzweig, 2010). Part of the explanation is that the continent is too diverse and decentralised to respond to top down and technocratic Green Growth type strategies (Frankema, 2014). Over past decades, researchers and policy makers have increasingly recognized that differences in culture, preferences, policies and institutions matter, placing an importance on understanding institutional diversity at the center of the research and policy agenda. Schouten et al. (2017) argue that in order to improve African food security institutional diagnostics is needed.

The role of institutions in development extends beyond debates about how to increase food security and promote growth. In recent years, a consensus has emerged that elevates institutions as a main determinant of economic development (Rodrik et al. 2004). As a result, institutional reform takes a central place in current development planning and policy objectives. Institutions are broadly defined as “the

humanly devised constraints that shape human interactions” (North, 1990). The institutional framework encompasses many dimensions, from slow moving variables related to culture and customs (e.g. Acemoglu et al., 2001; Williamson, 2005) to elements more amendable to change due to various pressures (Austin, 2008) and interventions by external agents. Unfortunately, our understanding of the determinants of institutional change, and how they relate to development outcomes is fragmented. This is due in part to key methodological flaws in many studies. Up until about two decades ago, researchers in political science and development economics largely relied on econometric models to establish causal claims. Using regression models researchers sought to include variables to control for potential confounding effects. However, key questions about inference remain, specifically related to endogeneity (how do I know what I am observing is X causing Y and not Y causing X?) and omitted variable bias (how do I know it is not a third variable, Z, doing the work causing changes in both X and Y?). Models are poorly fit to tackle these questions. How do researchers know if they are controlling for *all* relevant factors?

Critique has been mounting. For a long time, economists mistook “models and arguments that are valid only in specific circumstances for universal remedies” (Rodrik, 2010: 34). The resulting one-size-fits-all policy prescriptions, however, do not do sufficient justice to potential parameter heterogeneity—is the link between institutions and development the same for war-torn Sierra Leone and resource-rich Botswana? In each case the circumstances are different. Put more bluntly, Rodrik's message is that economists should “stop acting as categorical advocates (or detractors) for specific approaches to development. They should instead be diagnosticians, helping decision makers choose the right

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model (and remedy) for their specific realities, among many contending models (and remedies)." (2010: 35). Rodrik argues that economists should recognize the importance of context and embrace experimentation.

Increasingly, researchers have moved away from *model based inference* to *design based inference*, where experimental design—through randomization—ensures comparisons across units assigned to an intervention and units assigned to a control condition are causal and unbiased. Over the years, the number of studies using experimental methods have increased dramatically. Across the globe social scientists now work alongside international organizations and governments in developing countries in the field to test policies and programmes. This implies a revolution in the way development planning is organized (see Rodrik, 2008). Researchers and policy makers actively engage to identify the knowledge gaps, constraints and possible interventions and then engage in a phase of policy testing to learn what works and why. As a result, a much greater emphasis is placed on diagnostics (Rodrik, 2010). In a recent paper, Esther Dulfo, who has been seminal in promoting the experimental method in economics, pushes the issue further and sets out an argument why diagnostics are important: "*Economists are increasingly getting the opportunity to help governments around the world design new policies and regulations. This gives them a responsibility to get the big picture, or the broad design, right. But in addition, as these designs actually get implemented in the world, this gives them the responsibility to focus on many details about which their models and theories do not give much guidance.*" (2017: 1).

Both Dulfo and Rodrik call for researchers to become much more serious about how studies are designed and how we learn. However, even though field experiments have raised the bar on causality, they are often too narrowly defined and theory-free. There is much that can be done to improve diagnostics, in turn bettering the design of experiments. Part of the problem may be that too little attention is paid to careful diagnostics of the problem under study at the design stage. I argue that Rodrik's (2010) diagnostic framework provides a useful tool for improving the design of field experiments and ultimately to aggregating knowledge and improving development policy. By focussing on experiments, this paper address a methodological question on how to strengthen institutional diagnostics. Of course, sound diagnostics are not limited to experimental studies alone. In that respect, the issues raised below also apply to other non-experimental studies. I limit myself here to discussing experiments to allow for more focus and show where diagnostics could assist in improving the design of field experiments, as well as what we learn from them. The paper proceeds as follows. Below, I introduce what field experiments are and focus on the role of diagnostics therein. By way of illustration, I then describe a recent study on decentralised aid delivery in Sierra Leone, where researchers actively engaged with policy makers to develop a Community Driven Development programme and evaluation strategy. The paper closes with a set of promising developments that can further improve diagnostics in field experiments and ultimately increase development planning and knowledge aggregation.

2. The role of diagnostics in field experiments

In recent years, experiments have been embraced in development economics and political science as the core method to learn what development interventions work and why. Rodrik celebrates the rise of experiments as holding the promise of being "*explicitly diagnostic in its strategy to identify bottlenecks and constraints*" (2010: 41). What explains the experimental turn in social science? Primarily, researchers have been motivated by the increase in causal inference experiments offer. The experimental manipulation of an intervention enables the researcher to identify the impact of that particular intervention. Cox and Reid (2000) define experiments as: *investigations in which an intervention, in all its essential elements, is under the control of the investigator*. Control here has two dimensions. One is the control over the intervention (or in

Table 1
Stages in a Field Experiment.
Source: EGAP (2017).

1. Researcher motivation and research question.
2. Diagnostics: form partnerships, discuss main constraints, possible interventions and outcomes of interest
3. Diagnostics: prioritize and design a theory of change linking interventions to outcomes
4. Figure out randomization, levels, units and measurement strategies
5. Obtain ethical review for study
6. Gather pre-existing data and conduct power calculations
7. Seek peer review of draft design/pre-analysis plan
8. Register design
9. Pilot and implement baseline survey measurement
10. Assign Treatment
11. Take any intermediate measures and assess any problems
12. End of treatment
13. Gather endline measures (prepare instruments; train enumerators; pilot instrument)
14. Run analyses
15. Check analyses
16. Generate key tables and circulate policy relevant material immediately.
17. Make data and instruments available to others.
18. Complete write-up and submit for publication

language borrowed from experiments in the medical field: treatment). Who is being experimented on? What are the rules of participation? Will the intervention be implemented in similar fashion across sites? The second dimension is control over assignment of an intervention. This forms the line between observational and experimental work, from researching mere correlations to establishing causal effects. The key design question for causal inference is *what the world would have looked like without the intervention*. This is, of course, impossible to observe. However, this 'alternative world' can be created through experimentation. By random assignment of a treatment, researchers create balance across treated and untreated observations on all observed and unobserved variables except the intervention under study.

A typical field experiment consists of several phases (see Table 1 for a generic overview).¹ Starting from a motivation, interest or research question, researchers typically seek out a partner (an NGO, government, company) to develop, implement and evaluate an intervention (a program – for example cash transfers for refugees or a training program for farmers). In an ideal case, the research and policy team go through an extensive diagnostic exercise to identify what the key policy outcome is (i.e. increased food security) and what the policy instruments are (i.e. farmer field schools and fertiliser distribution). The way in which a policy produces a change in an outcome is typically (but not always) described in a theory of change. A theory of change is essentially a model of the world which sketches out the causal links between inputs (resources and activities), outputs (direct changes as a result of the intervention) and intermediate and final outcomes (impact of the intervention). A theory of change is the outcome of a process by which researchers and policy makers identify core constraints and trade off various options. Two observations stand out. First (and unfortunately), in many cases, the process goes undocumented and there is very little detail available on the theoretical and practical issues which, in the end, produce a particular type of intervention. Second, oftentimes experiments are too narrowly defined, lacking focus on structural development problems. Part of the problem is that at the design stage, too little attention is paid to careful diagnostics of the question under study. Rodrik, too, is critical about some field experiments: "*randomized evaluations typically generate relates to questions that are so narrowly limited in scope and application that they are in themselves uninteresting.*" (2008:5). Perhaps this is because at present there is little guidance on *how* such a

¹ For references on the 'how to' of field experiments, see Glennerster and Takavarasha (2013), Gerber and Green (2012), Dunning (2012) and Gertler et al. (2011) amongst others.

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