Testing Political Economy Models of Reform in the Laboratory

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A fast-growing theoretical literature on the political economy of reform has provided a sizable collection of models that have deepened our understanding concerning how distributional conflict manifests itself in the political process and can prevent efficiency-enhancing economic reform from taking place (e.g., see Allan Drazen (2000, chapters 10 and 13) for an insightful review). Unfortunately, systematic empirical work that provides direct tests of the validity and significance of the mechanisms articulated in these models has been limited. As Torsten Persson and Guido Tabellini (2000, page 481) note in their evaluation of the larger political economy literature, "The gap between theory and evidence is a final weakness of the existing literature. …when there is empirical work, its ties to the underlying theory are often loose… [and] are not tied well to the extensive form games or theoretical predictions in theoretical work. Ideally, we would like more empirical work 'derived from theory' as opposed to 'informed by theory.'"

One reason for the lack of such empirical studies is that most of these (often game-theoretic) models explain policy outcomes as a result of strategic interaction of forward-looking agents. Direct tests of these models using field data are subject to the same difficulties that researchers have faced when testing game-theoretic models in other areas such as industrial organization, since qualitative features of the equilibria often depend sensitively on the specific assumptions of the game structure (see Gilles Saint-Paul, 2002, as well as Richard Schmalensee, 1988, pages 675-6). In addition, the political economy literature of reform explains policy outcomes using political variables such as the distribution of voters' preferences and the nature of political institutions (see, for example, Drazen, 2000, and Stephan Haggard, 2000). But the time variation of these variables is often limited, leading to a classic identification problem and

making direct tests of theoretical models difficult (Saint-Paul, 2002).

Laboratory studies allow the researcher to manipulate explanatory variables of a theory as treatment variables, so such studies should be helpful in partially overcoming these difficulties and can complement field empirical work on reform. But the study of reform also poses new challenges to experimental economists, and a dialogue between political economists and experimental economists can enable both sides to capture gains from trade. This paper aims to illustrate this using an experimental study of the model in the influential paper by Raquel Fernandez and Dani Rodrik (1991).

I. An Experiment on Uncertainty, Reform, and Costly Political Participation

In a pioneering study, Fernandez and Rodrik (1991, hereafter FR) show how individual-specific uncertainty can prevent efficiency-enhancing reform from taking place. The following example from their paper illustrates the basic idea. Suppose a reform benefits citizens in the "winning sector" but hurts citizens in the "losing sector." Currently, 40 percent and 60 percent of citizens belong to the winning and losing sectors, respectively. Moreover, one-third of the citizens in the losing sector, representing 20 percent of all citizens, can switch to the winning sector if the reform occurs. When there is no uncertainty regarding who will gain or lose from reform, a majority of citizens (40 percent who are in the winning sector and 20 percent who are in the losing sector but can switch to the winning sector) will gain from reform. Therefore, if majority preferences determine the policy outcome, the reform will take place.

Now consider the effect of the following kind of uncertainty on the incidence of reform. Suppose that citizens in the losing sector know that one-third of them will be able to switch to the winning sector, but ex ante each one is equally likely to switch. Because of this uncertainty regarding who will ultimately gain or lose as a result of the reform, for some parameters ex ante

all citizens in the losing sector prefer the status quo to the reform. In this case, opponents of the reform will constitute the majority and reform will not take place. This occurs even though it is common knowledge that if the reform is adopted, it will enjoy majority support ex post.

In Cason and Mui (2002), we report a laboratory test of this simple version of the FR model, using 85 undergraduate students as subjects who were randomly placed into new five-person groups each decision period, for up to 40 periods (this "stranger" design minimizes potential repeated game effects). Two, one, and two subjects are randomly assigned the role of Blue, Green, and Red players, respectively, and all five players receive 5 experimental dollars (E$5) if the status quo is maintained. Both the Blue and Green subjects receive E$8 following reform and thus prefer reform to the status quo. The Blue subjects correspond to the individuals in the winning sector, while the Green subject corresponds to those who will be able to switch to the winning sector when reform takes place. The Red subjects receive E$1 following reform and correspond to those who remain in the losing sector. All subjects decide each period whether to support, oppose or abstain from participating in their group's reform choice. The reform occurs if it is supported by a strict majority of players in the group.

In the *Certain Roles* treatment, subjects learn their roles before they make their decisions so supporters of the reform constitute the majority. In the *Uncertain Roles* treatment, subjects are only informed whether they are Blue or non-Blue subjects before they make their decision. For the three non-Blue subjects the expected payoff from reform (E$10/3) is less than the certain payoff from the status quo (E$5), so opponents of reform constitute the majority. Since the only difference between the two treatments is the absence or presence of uncertainty, a between subject comparison of the incidence of reform across the Certain Roles and Uncertain Roles treatment provides a direct test of whether uncertainty reduces the incidence of reform.

Our experiment also introduces *costly political participation* to this reform game. Especially when a small number of groups or individuals influence a policy decision, it is reasonable to model their interactions as a competitive collective action problem. A political actor may benefit from reform, for example, but would need to incur costs–such as explicit lobbying costs, or the implicit political costs for taking a stand regarding a controversial reform—to influence a policy outcome. This costly participation creates an incentive to free-ride on fellow group members' efforts to influence policy. The FR model abstracts from costs of political participation to focus on how uncertainty affects the incidence of reform. When political participation is costless, the preferences of the majority will determine policy outcome. With costly political participation, however, whether reform will take place depends on the actual political support it obtains. In particular, using the participation game framework of Thomas Palfrey and Howard Rosenthal (1983), we show that if the minority are always more willing to incur the cost to influence policy than the majority both with and without uncertainty—which occurs in one type of equilibrium—then reform is more likely with uncertainty than with certainty. But in another equilibrium reform is less likely with uncertainty. The experiment allows us to determine which equilibrium is more consistent with subjects' behavior.

Our results show that both in the cases of costless and costly political participation, uncertainty reduces the incidence of reform. Overall, when subjects are certain of their roles and reform benefits, they implement the reform in 78 to 82 percent of the periods. Consistent with FR's original insight, adding uncertainty reduces the reform rate to only 47 to 66 percent of the periods. These differences are statistically significant in all four participation cost treatments. We also find that with only one exception, reform rates do not vary significantly with the participation cost. Moreover, regardless of whether uncertainty is present or not, the participation

rates of both the majority and the minority groups decrease in the participation cost.

II. Laboratory Method and the Study of Reform

The experiment described above is a modest attempt to employ the laboratory method to evaluate a political economy model of reform. Using this study as an illustration, we discuss here the general question of how the laboratory method can be useful in the study of reform, as well as the challenges that such studies pose for experimental economics.

FR's argument that individual-specific uncertainty can prevent reform from taking place has had significant impacts on the study of reform and other topics in the political economy literature. To our knowledge, however, there is no direct empirical test of the hypothesis that such uncertainty reduces the incidence of reform. The laboratory method permits a direct and controlled test of hypotheses that are explicitly derived from extensions of FR's theory.

Furthermore, although there are not yet many experimental studies on the political economy of reform, an experimental literature on related political economy issues exists that can help guide experimenters when adapting methodologies to and proposing new questions for the study of reform (e.g., Charles Plott, 2001). For example, by drawing upon the theoretical and related experimental literature on the participation game (Gary Bornstein, 1992, Arthur Schram and Joep Sonnemans, 1996), our laboratory study allows us to extend the FR model to derive predictions regarding how costly political participation may affect the behavior of political actors and the incidence of reform. The extended model demonstrates that with costly participation, under both certainty and uncertainty the participation game admits multiple equilibria, even restricting attention to what Palfrey and Rosenthal and others consider as the most plausible "totally mixed" Nash equilibria. In one type of equilibrium—which we call "type A"—the majority always participate with a higher probability than the minority, and in another type the

minority always participate with a higher probability than the minority. Moreover, in both types of equilibrium an increase in participation costs have opposite effects on the participation rates of the majority and the minority; for one group the participation rate decreases in the participation cost and for the other group the participation rate increases in the participation cost.

The laboratory study allows us to determine which type of equilibrium more accurately describes behavior because it provides access to micro-level data that are typically unavailable outside the laboratory. The type A equilibrium accurately describes behavior for participants in the majority group. However, the empirical result that participation rates decrease with the participation cost for both the majority and the minority in all treatments cannot be reconciled with either type of totally mixed strategy Nash equilibrium.

This result illustrates another important benefit of using laboratory methods to study reform: the laboratory enables one to gather evidence about behavioral regularities of human decision makers, which can in turn generate useful questions for field studies. For example, if future laboratory studies indicate that the negative relationship between participation costs and participation rates for both the majority and the minority is robust, this suggests that researchers should investigate whether this regularity is also observed in the field, as well as the extent to which this behavior may be important in determining whether reform will take place.

The empirical regularities also suggest questions that need to be addressed in future theoretical work. In Cason and Mui (2002), we explore whether or not one modification of Nash equilibrium—the quantal response equilibrium (QRE) developed by Richard McKelvey and Palfrey (1995)—can account for the negative relationship between participation costs and rates for all types of subjects in our experiment.[1] We find that the QRE almost always correctly predicts that the participation rates decrease for both the majority and the minority as

participation cost increases. It also tracks the behavior of the majority extremely well in both the Certain and Uncertain Roles treatments. The QRE also explains the minority's behavior better than the mixed strategy Nash equilibria, although there is still room for improvement.[2]

Experimental work on the political economy of reform is not merely a straightforward extension of laboratory research to a new domain of inquiry, however, because it poses new methodological challenges. For example, our experiment shows that uncertainty reduces the incidence of reform in small group participation games even with costly participation. Future research should investigate whether this result also holds with large groups. More generally, reforms often involve large scale distributional conflicts that affect almost everyone in society, and are rarely occurring political events. The study of reform thus requires experimenters to develop methods to study collective decision making for large groups in a controlled environment. Experimenters also need to capture rarely occurring political events more realistically, and also create different political institutions in the laboratory. Advancements along these lines will enable researchers to conduct laboratory studies on questions such as how differences in political institutions—e.g., parliamentary versus presidential—affect the adoption and sustainability of reform in two otherwise identical economies.

III. Concluding Remarks

A substantial gap exists between the stylized experiment summarized here and the political process affecting the adoption of actual reforms.[3] Many contributors to the political economy literature of reform have argued that efforts to close a similar gap between the theory and practice of reform should be a priority of researchers. As Drazen (2000, p. 404) observes, theorists are often concerned that too many factors are at play in practical discussions of real-world reform to model them with any degree of theoretical rigor; while practitioners often view

theoretical treatments of reform as elegant but "hopelessly out of touch with reality."

We view the role of experiments in the study of reform to have modest near term and ambitious long term goals to help close this gap. In the immediate and foreseeable future, we see experiments as most useful in providing direct controlled tests of theoretical models, as well as in generating new empirical regularities regarding human behavior in these reform settings that may guide future theoretical work. But eventually, sustained dialogues between theorists, experimenters and practitioners should generate useful insights and tools for addressing policy questions more directly.

The literature on market experiments provides a hint of how this might be possible. Early market experiments (e.g., Vernon Smith, 1962) were concerned with testing basic theoretical propositions, such as whether competitive equilibria are reached in markets populated by human traders even when agents are not infinitesimal price takers. Following the positive results of these early experiments, researchers could turn to study topics such as how existing, field trading institutions affected price formation. Eventually, because of the insight provided by the extremely detailed laboratory empirical data and the parallel development of game-theoretic models of auctions and other institutions, decades later theorists and experimenters could begin to design completely new trading institutions for transactions not even envisioned when the early experiments were conducted—such as combinatorial auctions for broadcast spectrum rights (e.g., Jeffrey Banks et al., 2003). This early laboratory research on markets had the benefit of being guided by a general and well established equilibrium theory, while unifying theoretical propositions that can provide guidance for an analogous development in the study of reform do not yet exist. A rewarding and challenging task lies ahead, but we believe that progress can be made through continued interactions between political economists and experimental economists.

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ENDNOTES

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[1] In a QRE, each player plays a stochastic best response: he does not choose a best response with probability one; instead, he chooses action that yields higher expected payoffs with a higher probability. A set of choice probabilities by all players constitute a QRE when each player's choice probabilities are a stochastic best response to the choice probabilities of all other players.

[2] In particular, for the minority the QRE predicts a higher participation rate than observed in the Certain Roles treatment and a lower participation rate than observed in the Uncertain Roles treatment.

[3] We do not view this as an argument that the experiment is not useful for the study of reform, however. The laboratory is a screen for basic ideas articulated in theoretical models; if a model does not predict behavior in controlled conditions where it should apply, there are reasons to be skeptical about its ability to explain behavior in more complex field settings (Plott, 2001).