

## Nonlocal Properties and Modeling Social Change – Long abstract

In the late 90s, the Swiss Agency for Development and Cooperation helped implement an anti-corruption program in Pakistan. One of their key moves was to raise wages in the public sector. In theory, wage increases should decrease the incentives of bureaucrats to take bribes, and so should also decrease the number of bribes solicited and taken. This prediction is made by a number of the prevailing “principal-agent” models of bureaucratic corruption, following Becker and Stigler 1974, and it is also supported by game-theoretic analysis and experiments, such as Azfar and Nelson 2004. In Pakistan, however, the reverse occurred. As wages increased, corruption did as well. Nor is Pakistan’s experience unusual: similar phenomena have occurred in recent years in a number of countries. Econometric studies, using a variety of empirical data, have repeatedly shown that there is either zero or negative correlation between wage increases in part of a bureaucracy and a reduction in corruption. Where have these models gone wrong?

The obvious source of failure for a model of a property like *the incidence of bureaucratic corruption* is when it underestimates or fails to incorporate some relevant causal factor, that influences the thoughts or actions of the individuals in the group being modeled. It may be, for instance, that increasing the pay of a bureaucrat tends to make her less risk-averse, and thus has the reverse effect than was intended. Or it may be that the influence of the organizational structure of a bureaucracy overwhelms the effects of wage increases, so that small changes there more than negate any changes in wages. Or it could be that external factors are at work, such as the possibility that an increase in pay might also increase family pressure to earn still more. When a model of some property of a group

of individuals fails, it seems we need a more realistic model of the psychology or preferences or other local properties of the individuals in the group, and of the causes affecting the local properties of those individuals.

In this paper I argue that many models, including models of bureaucratic corruption, suffer from a different flaw. They may actually do an adequate job capturing the factors that causally influence the people belonging to a group. Where they fail is not principally a matter of understanding causal factors or their consequences for affecting individual bureaucrats. Instead, their key trouble is in how they implicitly understand the nature of the properties they model, and in their neglect of certain logical components of those properties.

It is widely recognized that certain social properties of a group fail to supervene locally on the individualistic properties of the members of that group. This was pointed out by Currie 1984, and is discussed in particular by Pettit 1993 and 2003. Currie, for instance, notes that having the property *being Prime Minister* depends on what goes on in the minds and actions of more people than just Gordon Brown. Similarly, for 100 individuals to have the property *being a U.S. Senator* depends on the thoughts and actions of a wider population than those 100. It is often overlooked, however, that such dependence of social properties on people apart from those they apply to occurs even with properties that merely tabulate the psychological or behavioral properties of the members of a group. As I will discuss, even a function such as *the incidence of bureaucratic corruption*, which would seem to depend only on the aggregate actions of the small group of individuals who are bureaucrats, is instead in a sense “holistic” across the entire population. Properties and functions like this are commonly treated in the social sciences, yet models of such properties typically neglect their population-wide dependence, and thus fail to account for

how they change as circumstances do.

The aim of this paper is to consider the implications, for constructing models in the social sciences, of the fact that many typical social properties of groups depend on factors that are not local to those groups. This fact implies that when we construct models of those properties, we cannot limit ourselves only to ones that treat the local properties of members of the group, or even to models of those properties that causally interact with members of the group. If we do limit ourselves in that way, we risk missing out on relevant factors that influence the holding of the social properties. In many cases, nonlocal factors are plausibly the predominant way that simple properties of groups can be modified, in policy interventions. A model that only focuses on the causes impinging on local properties, or a policy prescription that only intervenes so as to affect local properties, may neglect the key influences on the social phenomena they are designed to describe or affect.

Yet models of the social properties of groups nearly always overlook this point. The way social models are typically designed means that they neglect nonlocal factors that do not interact with the members of the groups, even when those nonlocal factors are constitutive of the properties being modeled. To illustrate this, I will consider models of bureaucratic corruption. Corruption is a deeply explored and well-developed subject for economic modeling, and models of bureaucratic corruption are representative of a wide variety of approaches to model-building in economics. Nonetheless, models of corruption in general neglect nonlocal factors that figure into the incidence of bureaucratic corruption, when those factors do not interact causally with the bureaucrats themselves.