Chapter IX
A Dynamic Agent–Based Model of Corruption

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ABSTRACT

The author builds an agent-based model wherein the societal corruption level is derived from individual corruption levels optimally chosen by heterogeneous agents with different risk aversion and human capital. The societal corruption level, in turn, affects the risk-return profile of corruption for the individual agents. Simulating a multi-generational economy with heterogeneous agents, the author shows that there are locally stable equilibrium corruption levels with certain socio-economic determinants. However, there are situations when corruption can rise until it stifles all economic activity.

"You live in a society where everybody steals. Do you choose to steal? The probability that you will be caught is low ... and, even if you are caught, the chances of your being punished severely for a crime so common are low. Therefore you too steal. By contrast, if you live in a society where theft is rare, the chances of your being caught and punished are high, so you choose not to steal." (Mauro, 1998, p. 12)

INTRODUCTION

Understanding the dynamics of corruption level in a country is crucial for policy formulation. Can corruption keep rising indefinitely? The Indian political philosopher Kautilya talks about corruption as far back as in the 4th century B.C. It is unlikely that corruption has been rising continuously for over the last two millennia. Are there economy-wide forces that determine the "equilibrium" level of corruption in a country? Is this equilibrium a steady state or does it have cycles? What parameters determine its levels? How does the level of development affect it? Why is corruption more widespread in the developing countries than in the industrial nations? The aim of this chapter is to develop a dynamic equilibrium model of corruption that will help us answer these questions.

Tanzi (1998) and Bardhan (1997) provide fairly comprehensive surveys of the vast literature in the area of corruption. While most theoretical studies of corruption tend to focus on the micro models of the phenomenon studying individual acts of corruption, the empirical papers typically study corruption at the country level. There have been a few macro models of corruption with micro-foundations, like Acemoglu and Verdier (1998) and Ehrlich and Lui (1999), but their implications in a dynamic setting are not obvious.

The central insight of this chapter is that corruption at the societal level is the outcome of individual choice of corruption levels faced with a risk-return trade-off faced by an individual, similar to a portfolio selection problem. The trade-off, in turn, depends on the overall corruption level. The higher the level of corruption, the lower is its risk and rewards. We develop a multi-generation equilibrium model using this notion. Each generation consists of agents varying in their risk-aversion and human capital endowment. Each agent chooses to have an individual level of dishonesty (or individual corruption) based upon his individual risk-aversion, human capital endowment, and his generation's perception of the societal corruption level. These choices give rise to a national level of corruption that determines the perceptions of the next generation. Given the difficulty in arriving at a closed-form solution of the model, simulations are used to arrive at the results.

The next section discusses the issues in the definition and measurement of corruption. The third section lays down the formal model. The fourth section describes the simulations and presents the simulation results. The fifth section concludes with pointers towards future research.

DEFINING AND MEASURING CORRUPTION

Corruption is a slippery concept (see Bardhan, 1997; Tanzi, 1998). At a broad level perhaps it may be defined as Transparency International defines it: "abuse of entrusted power for private profit." As recent corporate scandals like Enron and WorldCom suggest, corruption exists in the private sector, though the public sector gets the maximum blame and scrutiny. For our purposes, a corrupt activity must satisfy three criteria. It must have a positive expected economic value to its perpetrators, since otherwise the perpetrators would have no incentive to be corrupt. It must carry some risk of socio-legal censure (else, irrespective of its ethicality, it must be the *custom* in the society in question and cannot be called *corruption* by the relevant social standards). Finally, it must adversely affect the economy. Corruption could be welfare-enhancing in the presence of sub-optimal laws (see Lui, 1985). However, the empirical evidence convincingly establishes the ill-effects of corruption (see Mauro, 1995; Campos, Lien, & Pradhan, 1999; Tanzi & Davoodi, 1997).[1] In other words, there is a dead-weight loss to society because of corruption (see Schleifer & Vishny, 1993). There are thus both income-reducing and income-redistributing effects of corruption.

A key distinction between a corrupt activity and other illegal activities is that the opportunities for corruption are not equally available to every member of society, but rather are highly correlated with the economic power enjoyed by an individual. This is not the case with other forms of illegal activity which are either equally possible for anyone to perpetrate or depend on factors not so closely related to economic power. The model we build in the following section takes into account this feature.

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