

Chapter XVI

FraudSim: Simulating Fraud in a Public Delivery Program¹

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ABSTRACT

This chapter shows that white-collar crime can be approached using an agent-based model. Fraud in public delivery programs often involves several entities that are loosely interrelated and interact dynamically. However, the crime literature has not paid sufficient attention to these characteristics, thus providing limited utility for public managers. This chapter frames a public delivery program as a complex system. The patterns of fraud in such a system are simulated using an agent-based model called FraudSim. We demonstrate that FraudSim closely replicates the statistical and spatial patterns of fraud and provides a framework for future work in this area.

INTRODUCTION

Fraud is a crime that violates social norms, uses secretive processes, injures victims, and benefits perpetrators unfairly (Barker & Roebuck, 1973; Vandenburg, 1999). In the public sector, fraud in welfare and health care programs has been well-documented (GAO, 1998, 2005). To minimize

fraud, public agencies have utilized several fraud prevention and detection mechanisms (Bolton & Hand, 2002). For example, fraud prevention focuses on procedures to avert fraud, using methods such as watermarks and personal identification documents before fraud occurs. Fraud detection focuses on identifying those who committed fraud after it has occurred using statistical methods or

actual investigations. However, many of these traditional mechanisms may be static and ineffective in preventing or uncovering complex interactions among corrupt agents (Fawcett & Provost, 1997; Glover & Aono, 1995). Therefore, there is a need to develop an alternative framework to address such complex and adaptive problems in public management. In this research, we developed an agent-based model called FraudSim that can be used to simulate and analyze crime patterns in public service delivery programs. In the remainder of this chapter, we first discuss the context of our research based on a literature review of white-collar crime and related issues. We then discuss our agent-based modeling framework and its implementation. This model is then tested against empirical data for the purpose of evaluation. We conclude this chapter with a discussion on the limitation and future of this research.

BACKGROUND

Traditional sociologists recognize crime to be influenced by multiple dimensions of social life. A traditional theory of criminal behavior finds criminality to be caused by poverty or the psychopathic and sociopathic conditions associated with poverty. Crime is a function of socioeconomic factors, or possibly biological factors. Criminals are similar to those who are irrational or have mental illness due to societal oppression or disease. An appropriate way to eliminate crime is to attack the root cause of crime through job creation and income maintenance (Cooter & Ulen, 2000).

Sutherland (1940) argued that the traditional conception of crime and explanations were misleading and incorrect. He argued that the traditional theory was derived from data provided by criminal justice agencies, which focused on lower class crime. A general theory of crime should include white-collar crime, and white-collar criminality is not different from the criminality of the lower class. Both types of criminality are

learned rather than simply influenced by the psychopathic and sociopathic conditions.

While Sutherland (1940) provided a compelling view of criminality as learning behavior regardless of social class, white collar crime has primarily been interpreted as crime committed by a person of respectability and high social status in the course of his occupation (Baker, 2004; Braithwaite, 1985). White-collar criminals are mostly recidivists, and their illegal behavior is much more extensive. They often do not lose status among associates, even after violating the laws designed to regulate business (Sutherland, 1982). However, the usefulness of the distinction of crime by social status has been a source of debate in crime theory (Griffin, 2002; Hirschi & Gottfredson, 1987; Lynch, McGurrin, & Fenwick, 2004). Empirical studies on social class and punishment have also yielded mixed results (Benson & Walker, 1988; Wheeler, Weisburd, & Bode, 1982).

The current definition of white-collar offenses by the Department of Justice shows that it constitutes those nonviolent illegal activities, which principally involves traditional notions of deceit, deception, concealment, manipulation, breach of trust, subterfuge, or illegal circumvention (Baker, 2004). Levitt and Dubner (2005) argued that “despite all the attention paid to rogue companies like Enron, academics know very little about the practicalities of white collar crime” (p. 46). Friedrichs (2004) suggested an integrated theoretical approach, describing cases such as the Enron scandal as “an outcome of a complex interaction of many different factors and variables, operating on various levels” (p.116).

Crime Opportunity

A group of criminologists has focused on crime as events and actions. The studies rooted in routine activity theory are interested in spatio-temporal dynamics of crime (Cohen & Felson, 1979; Felson, 1994). Routine activity theory is a micro-level

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