

## Agent-Based Modeling to Simulate the Dynamics of Health Insurance Markets

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**Abstract :** The healthcare system in the United States is considered to be one of the most inefficient and expensive systems when compared to other developed countries. Consequently, there are persistent concerns regarding the overall functioning of this system. For instance, the large number of uninsured individuals and high premiums are pressing issues that are shown to have a negative effect on health outcomes with possible life-threatening consequences. The Affordable Care Act (ACA), which was signed into law in 2010, was aimed at improving some of these inefficiencies. This paper aims at providing a computational mechanism to examine some of these inefficiencies and the effects that policy proposals may have on reducing these inefficiencies. Agent-based modeling is an invaluable tool that provides a flexible framework to model complex systems. It can provide an important perspective into the nature of some interactions that occur and how the benefits of these interactions are allocated. In this paper, we propose a novel and versatile agent-based model with realistic assumptions to simulate the dynamics of a health insurance marketplace that contains a mixture of private and public insurers and individuals. We use this model to analyze the characteristics, motivations, payoffs, and strategies of these agents. In addition, we examine the effects of certain policies, including some of the provisions of the ACA, aimed at reducing the uninsured rate and the cost of premiums to move closer to a system that is more equitable and improves health outcomes for the general population. Our test results confirm the usefulness of our agent-based model in studying this complicated issue and suggest some implications for public policies aimed at healthcare reform.

**Keywords :** agent-based modeling, healthcare reform, insurance markets, public policy

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