Estimating the Willingness to Pay to Avoid Violent Crime: A Dynamic Approach

Kelly Bishop and Alvin Murphy
Common wisdom might say that a sense of safety is priceless. Yet property values are highly dependent on this feeling of security, in addition to other unobservable neighborhood attributes, such as school quality. In their paper, “Estimating the Willingness to Pay to Avoid Violent Crime: A Dynamic Approach,” Olin assistant professors of economics Kelly Bishop and Alvin Murphy update and refine an economic model traditionally used to estimate demand for products with changing attributes. The updated model more precisely describes buyers’ behavior by reflecting a buyer’s consideration of the future.

In this study, Bishop and Murphy refine the standard model, known as the Hedonic Model, by using housing purchase decisions as a subject. In the standard Hedonic Model, buyers were assumed to estimate a house’s value based solely on information apparent at the point of purchase. In addition, the model did not reflect associated costs, such as the costs associated with finding and moving to a new location.

In their dynamic model, the authors incorporate a buyer’s consideration of future benefits when purchasing a product for which attributes change. A home buyer, for example, would evaluate the level of crime going on in a neighborhood and decide whether to continue living there based on whether he thinks crime rates are rising or falling. Based on this consideration of the future, a homeowner can also decide to move and incur moving costs or to stay put.

To compare the two approaches, Bishop and Murphy use housing data to estimate household willingness to pay to avoid violent crime. They apply their dynamic estimator and the traditional Myopic Model to a set of data on housing transactions and crime rates in the Bay Area of California. The results show that the standard model estimates that an average household is willing to pay approximately $10 a year to avoid one additional crime per 100,000 residents, while Bishop and Murphy’s dynamic model estimates approximately $13 for the same benefits. This indicates that the standard model presented a 21 percent downward bias in willingness to pay.

Bishop and Murphy point out the usefulness of the more realistic dynamic model for analyzing costs and benefits with public goods such as a local police force. For a community of 100,000, the Myopic Model would underestimate the residents’ collective willingness to pay to avoid a single violent crime by about $278,870 per year. Such a sum would be enough to expand the local police force, even including nonsalary benefits.

The Hedonic Model has long been used by everyone from Zillow, a popular real estate valuation website, to local and federal government agencies to estimate the prices and demand for such invisible but highly important "products." By updating the Hedonic Model to describe a forward-looking buyer, Bishop and Murphy give industries as varied as public finance and real estate a more nuanced tool for understanding complex buyer behaviors and, by extension, a way to make such markets more efficient.