

Chapter 6

Hedonic Models of Heterogeneous Goods

6.1 Introduction

More often than not economists treat marketed goods as homogeneous and estimate demand curves for goods with homogeneous quality. An economist might be interested in estimating the demand for water from a public water supply, where public water is viewed as a homogeneous good whose quality declines as a result of contamination. Bottled water would normally be considered a separate although related good. A market demand curve would exist for each, although each demand would be conditioned on the price and quality of the other.

The degree of heterogeneity varies with commodities. A book may sell in both hard cover and paperback with no other substantive difference among copies of the same book. Some commodities, like electrical appliances, vary across makes and models with different units of the same model effectively identical. Some commodities are so heterogeneous that each *unit* is essentially a different good. The prime example is real estate or, more specifically, housing. Location is critical in housing. No two properties can occupy the same location, so no two properties can be identical however similar their structural characteristics. Whether the heterogeneous good is an automobile or a house, markets will force higher quality units to sell at higher prices. Better cars or houses may be more expensive to produce. These more expensive goods are produced because people are willing to pay more for them. Economists have long believed that the trade-offs households make between price and quality

characteristics should reveal something about the value they place on changes in those characteristics.

Since *in situ* environmental quality can sometimes be an important characteristic of housing, economists have attempted to use the market relationship between housing price and environmental quality to obtain welfare measures of changes in the quality. This chapter reviews the theory of hedonic models as applied to housing and evaluates what can and cannot be said about welfare effects of quality changes using this construct. In Chapter 7, we explore a separate body of hedonic literature that uses wage/job risk trade-offs to deduce willingness to pay for changes in risk. In the second part of that chapter, efforts to combine wage and property hedonics to value such regionally varying amenities as climate will be explored.

Our ability to evaluate welfare effects in the context of hedonic markets is limited in part because it is difficult to recover enough information about preferences. Welfare evaluation is further complicated because the level of the public good is not imposed on households. They can adjust their consumption of it by changing their residence or job. By such adjustments, they may face a different price or wage. With a sufficiently large change in the public good, and consequent adjusting by households, the entire price/wage schedule may change. These issues were not encountered in Chapters 3 and 4 because no markets intervened and the public good was seen as being imposed on the individual. Chapter 5's treatment allowed individuals to make discrete choices among 'packages' of cost/quality combinations and therefore to adjust the level of the public good that affected them, but these decisions did not induce changes in the price schedule. In this and the next chapters, the action takes place in a market setting with the consequence that policy changes or exogenous events will quite often lead to changes in price.

6.2 The Theory of Hedonic Models

The most popular model of quality differentiated goods is the hedonic model, whose theoretical underpinnings were developed by Rosen (1974) in the context of the housing market. Rosen initially constructed the model in terms of both consumers and producers, incorporating consumer preferences and producer decisions to add to the housing stock or renovate existing structures. However, it is easier and more intuitive to tell this story for a given stock of housing and housing characteristics, assuming a perfectly inelastic supply at a point in time. The existing housing stock typically dominates the housing market so that producer decisions in any one year may add no more than one or two percent to the stock. Most researchers take the stock of housing and housing attributes as fixed and model prices as determined by the distribution of these