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Contaminated sites and information in hedonic models: An analysis of a NJ property disclosure law

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ABSTRACT

This paper explores the impact of information on the hedonic valuation of proximity to contaminated sites. The analysis exploits the passage of a 2004 New Jersey property disclosure law to identify an external change in information. The law required real estate sellers to disclose information about nearby contaminated sites. After presenting a model of the impact of disamenity information on home prices, we use several econometric variations to test hypotheses about the effects of additional information. Results indicate that the impact on home prices near contaminated sites depended on the baseline information about contamination. Homes prices near widely-known contaminated sites did not see a change after the disclosure law. However, homes near sites that were less well-known before the disclosure did see a drop in price as home buyers were given new information. Our results have several important implications on the assumptions of the hedonic model and could be used to formulate more effective disclosure laws in the future.

1. Introduction

The hedonic method has been a major tool in the valuation of environmental disamenities. A variety of studies have examined the impact of land contamination on property values, and a 2006 EPA workshop on estimating the benefits of land cleanup and reuse declared hedonic property analysis a central method for analyzing impacts. However, the valuation of contaminated sites is complicated by counterintuitive risk pathways, divergence between actual and perceived risk, and stigma, yielding mixed results in the literature (Greenstone and Gallagher, 2008a; Gamper-Rabindran and Timmins, 2011).

Recent empirical work has moved to exploring the factors that complicate hedonic analysis, focusing on the strength of the assumptions of the hedonic model. In particular, an important topic in the analysis of contaminated sites is the role of information. The hedonic model assumes full information on the side of both the buyer and seller. If information on environmental risk is not clear or easily accessible to the public, it won't be properly incorporated into property prices. It is frequently the case that the seller has more information about environmental risks than the buyer (Pope, 2008b), and there can be considerable scientific uncertainty about the actual exposure pathways and impacts.

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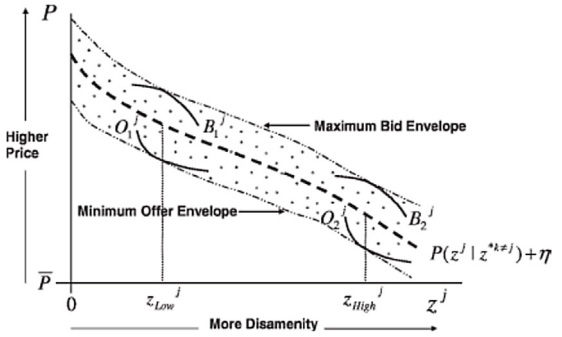

Fig. 1. Bid and Offer Curves in the Presence of Asymmetric Information.

Source: (Pope, 2008b)

Following the general trend in this literature, hedonic studies are split on these issues of information. Zabel (2007) explores several avenues through which imperfect information can disturb a hedonic analysis and finds that there may be significant welfare loss. Although Gayer et al. (2000) found that residents around contaminated sites can perceive risks similar to technical measures, (Messer et al., 2006) found significant evidence for stigma, indicating residents' perceptions did not align with technical measures. Pope (2008a) and Pope (2008b) use the passage of disclosure laws to explore information asymmetries in the housing market using difference-in-differences (DID) techniques. The first paper uses the passage of a disclosure law on flood zones as a quasi-experimental "treatment," while the second uses an airport noise zone disclosure. Pope stresses that sellers have lower search costs than buyers, which may cause attenuation bias in estimated prices. Sellers recognize that uninformed buyers' bids are insensitive to changes in the quality of a home attribute, so the tangency between buyers' bid curves and sellers' offer curves expand to a wider zone as the fraction of uninformed buyers in the market increases, as pictured in Fig. 1. Pope (2008a) and Pope (2008b) both find significant differences in implicit prices after the disclosure law was passed. Since many disclosure laws essentially re-provide public information, the papers suggest that there are cases where the full information assumption of hedonics should be questioned. In those cases, the estimated impact from a conventional hedonic model may instead represent a lower bound of the true willingness to pay (WTP).

In this paper, we examine the impact of a disclosure law's passage on the effect of contaminated sites on New Jersey home sales. Unlike Pope's previous disclosure papers that focused on disamenities with clear boundaries, the risk of contaminated sites does not have a clear extent. We use a variety of models to explore the change in information caused by the disclosure law, exploiting existing information and risk across site types. Although the overall property market impact of the disclosure law was to increase prices, the impact of the disclosure law on home prices near contaminated sites depended on the type of information existing before the disclosure. Homes prices near widely known contaminated sites did not see a change in the implicit price of contamination after the disclosure law. However, homes near sites that were less well known before the disclosure did experience a drop in price.

The remainder of the paper is organized as follows. Section 2 reviews the literature and recent work on hedonic methods as applied to environmental disamenities. In Section 3, we introduce a simple model that explains how housing prices are affected by buyer's beliefs about the costs of environmental disamenities. The model accommodates several outcomes of bargaining power that can affect the sales' surplus (the buyer's valuation minus the seller's valuation). Section 4 provides background for the New Jersey Disclosure law and describes the data. Section 5 describes the various specifications we examine. Section 6 provides the empirical results, and Section 7 concludes.

2. Literature review

2.1. Land contamination and property prices

Kiel and Williams (2007) perform a meta-analysis on 55 sites found on the US EPA National Priorities List (NPL) and find heterogeneity in impacts across sites.[1] Descriptions of some of the earlier literature can be found in Jackson (2001) and Boyle and Kiel (2001), who report disagreement across studies concerning the impact of contamination on home prices. More recently, Braden et al. (2011) conduct a meta-analysis of properties around NPL and non-NPL sites in North America and find that water-related sites typically have a larger impact on home values than land-based sites, and that NPL sites typically have a smaller effect than others, possibly because people expect them to be cleaned up. Hedonic studies have also examined a range of contamination types. For example, Deaton and Hoehn (2004), Noonan et al. (2007), and Messer et al. (2006) analyze one or more superfund sites in specific areas, while Ihlanfeldt and Taylor (2004) examine the impact of non-NPL hazardous sites on industrial and commercial properties near Atlanta, Case et al. (2006) and Zabel and Guignet

[1] An interesting result of their study was that larger sites with fewer blue collar employees in the surrounding area are likely to decrease property values.