

Working Paper Series

WORKING PAPER NO. 877

STIGMATIZED ASSET VALUE
IS IT TEMPORARY OR PERMANENT?

by

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June 1999

Stigmatized Asset Value: Is it Temporary or Permanent?*

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June 10, 1999

Abstract: Stigma is a negative attribute of real estate acquired by the discovery of contamination and reflected in its value (Elliot-Jones, 1996). Using a theoretical model with external economies and adjustment costs, we show that both temporary stigma and permanent stigma are possible equilibrium outcomes after the discovery and cleanup of a hazardous waste site. The existence and duration of stigma are examined using hedonic price techniques with data from housing sales prices in Dallas County, Texas. The empirical evidence shows that stigma exists after cleanup only for properties in very close proximity to the hazardous waste site.

JEL Classification: Q2, R31

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I. Introduction

The public has become increasingly aware of environmental risks since the 1970's. This awareness is reflected in the negative impact of environmental contamination on property values. Stigma is a negative attribute of real estate acquired by the discovery of contamination and reflected in price (Elliot-Jones, 1996). The two possible causes of stigma are uncertainty and path dependence. If the less obvious cause, path dependence, is present, then reversing an event (such as cleaning up a hazardous waste site) will not result in the same outcome that would occur had the event never occurred. Another term that could be used in place of path dependence is hysteresis, *viz.*, history matters. The uncertainty that causes stigma is over whether the property is still a health risk after cleanup and potential future cleanup liabilities. Some analysts have argued that uncertainty is a cause of stigma (Mundy, 1992), but no one has considered path dependence.

Once environmental contamination becomes associated with a particular neighborhood, its property values may be stigmatized. Consider Love Canal: even if a potential homebuyer believes that this area has been cleaned up, he or she will probably demand a discount for a Love Canal address. The resale value will most likely be lower than a comparable property without a history of contamination, if there is a market for the residential property at all. He or she may also consider that the type of person who would buy a house with a Love Canal address may not be an ideal neighbor. This reluctance to buy can be reflected in lower residential property values and may be based on perceived risk that has no scientific foundation.

A neighborhood may be distinguished as undesirable if it is identified as contaminated. It becomes an unfashionable address. Real estate has an intangible component, which is the public's perception of the location. This is similar to the intangible asset of goodwill on a corporation's balance sheet. When the public perceives a neighborhood to no longer be fashionable, the value of the intangible component of property values falls. The past presence of the hazardous waste site can affect the time path of the composition of residents in the neighborhood and other attributes which determine neighborhood quality and property values. By making the neighborhood less desirable, the hazardous waste site decreases the value of the neighborhood's property, making it more affordable to lower-income families and less attractive to higher-income families. Over time, higher-income residents will relocate, and, as a

result, the by-products of high-income residents, such as social status, good schools, low crime rates, quick police response, and well-maintained, owner-occupied homes may disappear. Therefore, temporary environmental problems may permanently change the character of a neighborhood creating stigma.¹ In a worst case scenario, outside business may "redline" the area causing neighborhood businesses to relocate. In this scenario, it is unlikely property values will rebound.

A likely scenario is that property values will rebound to some extent after cleanup, but they will not be as high as they would have been if the hazardous waste site had never existed. This is not the only possible scenario. It may also be the case that property values completely recover after cleanup. Property values could also actually fall after cleanup. In this perverse scenario, if there is negative publicity surrounding the cleanup, it is possible that property values could well decline.

Previous studies have attempted to measure benefits from the cleanup of hazardous waste by showing that residential property values decline as the distance to a hazardous waste site decreases (for example, Ketkar, 1992; Thayer *et al.*, 1992). Extending this argument, if the hazardous waste site is removed, then the discount for being in a location that is close to a former hazardous waste site should be recouped. After environmental contamination is remediated, *ceteris paribus*, one would expect residential property values to regain their lost values. According to this argument, the benefits of cleanup are then the difference between what property values were without the hazardous waste site and what property values are with the hazardous waste site. As discussed earlier, if there is path dependence, then this reasoning is faulty. Consequently, if stigma effects from a site exist, then past studies that have made this value recoupment argument may have overestimated the benefits of cleanup of hazardous waste sites.

Another possible cause of stigma is uncertainty. There are two major sources of uncertainty: (1) whether the property is still a health risk even after the property has been remediated and (2) what future potential liabilities exist and who is responsible for them. Using an expected utility approach, it can be shown that the uncertainty surrounding hazardous waste sites can result in lower property values (Boyd *et al.*, 1996). More generally, a monetary value can be placed on irreversible events such as a permanent change in health status and loss of life,

based on the choices an individual makes about income, consumption and risk. A potential buyer must be compensated for the expected value of future damage to his health and an amount equal to a certainty equivalent to compensate for the risk associated with the contaminated site.

Uncertainty can also make it difficult for prospective buyers to obtain financing. Lenders have become increasingly aware of the risks of mortgaging contaminated properties. Lenders' willingness to provide financing on contaminated properties fell from the late 1960's to a low point in the early 1980's where it stayed until the early 1990's, when it started to increase again. During the low willingness-to-finance period, the vast majority of lenders would not consider providing financing until the property has been cleaned up and tests within required limits. The net result of the loss of mortgagability is often that the property is held off the market.² However, a recent increase in the understanding of the management of the risk surrounding contaminated properties has led to a greater willingness to provide financing for these properties.

A potential additional source of uncertainty emerges over future property values and attributes caused by self-fulfilling prophecies. Prospective buyers and sellers can also have expectations over which equilibrium will eventually win out. If after cleanup, a property owner believes her neighborhood is clean, but she thinks that her neighbors do not believe the neighborhood is clean, then she may expect relative neighborhood property values to decline. These expectations of his neighbors' expectations may lead her to believe that the higher-income neighbors will relocate. The classic example of self-fulfilling prophecies is the "Big Push" story told by Rosenstein-Rodan (1943). In this scenario, the willingness of firms to invest depends on their expectation that other firms will invest, so that the objective of development policy is to create convergent expectations around high investment. Models with multiple equilibria driven by expectations have also appeared in the industrial organization and macroeconomics literatures. In industrial organization literature, expectation-driven multiple equilibria appear in models with network externalities, such as Farrell and Saloner's (1986) model of technology adoption. In the macroeconomics literature, these equilibria result from models of economies with search, such as Howitt and McAfee (1988).

In this paper, we use a theoretical model with external economies and adjustment costs to show that both temporary stigma and permanent stigma are possible equilibrium outcomes after the discovery and cleanup of a hazardous waste site. The former is driven by risk and uncertainty, while the latter is the result of path dependence. The existence and duration of stigma are then tested for by estimating a hedonic price model with data from housing sales prices in Dallas County, Texas. The RSR lead smelter in West Dallas, which operated from 1934 to 1984, caused soil contamination from air emissions and slag material. The pooled data set used in this analysis covers the period 1979 to 1995 and includes over 200,000 observations. Finally, the separable causal effect of media coverage is analyzed over time.

II. Previous Empirical Studies

The current body of literature on the empirical effects of locally undesirable land uses does not address whether the diminution of property values caused by these land uses is temporary or permanent or whether path dependence effects exist. Although there have been many previous studies which attempt to measure the effect of environmental contamination and cleanup on property values, they focus on a short-run phenomenon. Most importantly, existing studies have not analyzed post-cleanup property values. Typically, impacts of contamination on property values are examined with a cross-sectional data set at a single point in time.³ By not including post-cleanup property values, these studies cannot structure the event analysis correctly to analyze the effects of cleanup.

Many authors have used property value data to value environmental attributes and, more specifically, study the impact of hazardous waste sites. Researchers, such as Ketkar (1992), Kiel (1995), Kiel and McClain (1995), Kohlhase (1991), Smith and Desvousges (1986), and Thayer *et al.* (1992) have consistently found that proximity to hazardous waste sites and other locally undesirable land uses (LULUs) has a negative impact on property values.⁴

Contingent valuation is an alternative approach to property value studies for estimating benefits from the cleanup of hazardous waste sites. For example, Burness *et al.* (1983) and Smith and Desvousges (1986) have used contingent valuation to estimate willingness to pay to reduce the risk associated with a hazardous waste site. However, as