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Stigma and Value

The value effects of contamination are currently receiving considerable attention. Direct market evidence, such as that provided by comparable sales, is difficult to obtain and often does not offer significant insight into factors that influence the value of contaminated property. The meagre evidence available suggests that the market is acting irrationally as a result of a difference between real and perceived risk and that unexplained value effects exist (i.e., the value of a clean property does not equal the contaminated value plus the cost to cure). This article discusses the causes of stigma as well as how stigma may explain a great deal of present market uncertainty.

The real estate valuation literature is only beginning to address the effects contamination has on the value of real estate. Recently, several articles have appeared concerning various methods of dealing with the impact that contamination has on value.[1] These articles deal with quantifying variables on which data are relatively easy to obtain, such as the cost to remove or encapsulate asbestos and the cost to clean soil contaminated by a leaking underground storage tank. In addition, quantitative techniques such as market research are used to estimate the change in value caused by contamination.[2] The literature indicates that often a mathematically derived conclusion regarding an effect may not correspond with the opinion of the public at large. In other words, real risk may not be synonymous with perceived risk.

The value paradigm of value before contamination minus value after contamination equals compensation can be restated to apply to contaminated property.

$$V_b - V_a = \text{compensation}$$

1. See, for example, Peter J. Patchin, "Valuation of Contaminated Properties," *The Appraisal Journal* (January 1988): 7–16; Albert Wilson, "A Valuation Model for Environmental Risk," *Focus* (January 15, 1990): 17–20; Albert Wilson, "Environmental Risk Evaluation," *Focus* (March 30, 1990): 6–29; and Maxwell O. Ramsland, Jr., "An Asbestos Assessment Model: A Valuation Methodology for Appraisers," *Environmental Watch* (Spring 1990): 2–4.
2. William N. Kinnard, Sr., "Analyzing the Stigma Effect of Proximity to a Hazardous Materials Site," *Environmental Watch* (December 1989): 4–7.

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where

V_b = Value before contamination
V_a = Value after contamination

or

$$V_c - V_d = \text{damage}$$

where

V_c = Value clean
V_d = Value dirty

From a mathematical perspective, damage should equal the cost to cure.[3] However, if a contaminated property were valued using two different methods to determine damage, the conclusions would probably not agree. For example, in one instance damage might be considered equivalent to the cost to cure, while in a second instance damage might be estimated using multiple regression in which a dummy variable represents damages. Using a carefully developed data set (e.g., two neighborhoods similar in all respects except in their levels of contamination) and a well-specified model in which multicollinearity is zero and the R^2 is 1.00, the damage estimate would probably be found to be greater if the latter technique is used than if the cost-to-cure method is used. The reason for this inconsistency is that the damage is the sum of the cost to cure plus a stigma effect. Examples of this dichotomy are discussed in Peter Patchin's article, "Contaminated Properties—Stigma Revisited," in which he notes that "In many cases, stigma has little relationship to cleanup costs."[4]

Stigma influences are beginning to be recognized by the courts. In a recent ruling by the Washington Board of Tax Appeals, the board agreed that certain variables that influence value, such as a capitalization rate, can be affected by an environmental stigma.[5] What is an environmental stigma? What is its origin? Can such a stigma affect two equally contaminated properties differently? How can the amount of stigma be quantified? These are some of the questions this article attempts to address.

WHAT IS STIGMA?

The characteristics of social stigma may be summarized as follows.

> It is the essence of the stigmatizing process that a label marking the deviant status is applied, and this marking process typically has devastating consequences for emotions, thought, and behavior. Many words have been applied to the resulting status of the deviant person. He or she is flawed, blemished, discredited, spoiled, or stigmatized . . . .
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> The mark may or may not be physical: It may be embedded in behavior, biography, ancestry, or group membership. It may also be possible to conceal it. The mark is potentially discrediting and commonly becomes so when it is linked through attributional processes to causal dispositions, and these dipositions are seen as deviant. Furthermore, the discredit becomes more consequential when the deviant dispositions are judged to be persistent and central and,

3. Albert Wilson, president of the Hazardous Materials Institute, would argue that the term "cost to cure" is inappropriate because we never really know if a problem is cured. Generally what is accomplished is the problem is controlled. Speech at the Appraisal Network and Real Estate Counseling Group of America, Inc., meeting in Orlando, Florida, February 28, 1991.
4. Peter J. Patchin, "Contaminated Properties—Stigma Revisited," *The Appraisal Journal* (April 1991): 169.
5. Washington Board of Tax Appeals, *Northwest Cooperage Company, Inc.* v. *Ruthe Ridder, King County Assessor*, Tax Lexis 208, July 12, 1990, #36278–36280.

therefore, part of the marked person's identity.[6]

Environmental stigma is the result of an undesirable event that disrupts the balance of an environmental system.[7] This disruption may cause blame to be associated with it. The following seven criteria are used to evaluate and determine the degree of stigma.[8]

1. *Disruption*—Would the contamination alter a given person's normal, day-to-day behavior? The examples of a leaking underground storage tank (LUST) and the Exxon Valdez oil spill in Prince William Sound, Alaska, will be used to contrast some of the criteria. If the LUST does not cause off-site problems and alternative sites from which to obtain fuel are readily available, the LUST will probably cause little, if any, disruption. In contrast, the oil spill caused tremendous disruption to fishermen and Alaskan natives in Prince William Sound.
2. *Concealability*—The old bromide "out of sight, out of mind" applies to stigma. A LUST cannot be seen, smelled, or felt. In contrast, the Prince William Sound spill was highly visible to the world through extensive television coverage.
3. *Aesthetic effect*—To what extent does the contamination visibly alter the environment? The LUST is out of sight; however, rocks along the shoreline and marshes still show the effects of the oil spill.
4. *Responsibility*—To what extent was an individual or an entity responsible for the contamination? Research shows that the more direct the association between the stigmatizing event and the responsible party, the greater the stigma effect that will accrue to both the event and the responsible party.
5. *Prognosis*—The prognosis for contaminated property contains two elements: 1) the severity of the contamination; and 2) the persistence of the contamination. For instance, PCB contamination from a transformer may not be severe and may affect only a small area, but because of its chemical characteristics, it will persist for many years.
6. *Degree of peril*—Peril is multidimensional—a contamination event can affect the health of humans, wildlife, and fauna. In other words, peril is viewed broadly as affecting the entire environment. For a LUST, a worst-case scenario might be a contaminated aquifer. In the case of the Prince William Sound spill, the entire food chain of native Alaskans living in the areas affected by the spill has been disrupted.
7. *Level of fear*—Aaron Wildavsky, in his article, "No Risk is the Highest Risk of All," describes this phenomenon:

6. Edward E. Jones, Amerigo Farina, Albert H. Hastorf, Hazel Markus, Dale T. Miller, and Robert A. Scott, *Social Stigma: The Psychology of Marked Relationships* (New York: W.H. Freeman and Co., 1984), 4–7.

7. Michael R. Edelstein, *Contaminated Communities: The Social and Psychological Impacts of Residential Toxic Exposure* (Boulder, Colorado: Westview Press, 1988), 6.

8. Ibid., 14.

> How Extraordinary! The richest, longest lived, best protected, most resourceful civilization, with the highest degree of insight into its own technology, is on its way to becoming the most frightened.
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> Is it our environment or ourselves that have changed? Would people like us have had this sort of concern in the past? . . . Today, there are risks from numerous small dams far exceeding those from nuclear reactors. Why is the one feared and not the other? Is it that we are just used to the old or are some of us looking differently at essentially the same sorts of experience?[9]

While it may be relatively easy to quantify the cost to remedy a simple contamination problem, as the complexity of the contamination increases the level of uncertainty and perceived risk rises.

When environmental features are viewed as repellent, upsetting, or disruptive, they are stigmatized as undesirable. One source of stigma is technologies such as petroleum processing, nuclear power plants, and high voltage or transmission lines. A second source of environmental stigma is activities like the transportation of hazardous materials, the development of hazardous storage sites, or the underground storage of petroleum products. The third source of stigma is within the products themselves, including petroleum-based products and agricultural products associated with a health risk, such as the Alar used by the Washington apple industry.

The consequences of environmental stigma can be direct or indirect. Examples of direct consequences of various stigmas are an increasing incidence of cancer, lower work quality as a result of air or noise pollution, decreased occupancy in an apartment building, or lower market price or increased marketing time for single-family residences located adjacent to a sanitary landfill. Consequences can also be indirect, however. The exodus of residents from an area affected by contamination, such as the Love Canal area of New York, or the negative economic impact on the apple industry in general caused by the few producers that used Alar, are two examples.

An environmental stigma results from perceptions of uncertainty and risk. It may be relatively easy to quantify the cost to remedy a simple contamination problem, such as a leaking underground storage tank. However, as the complexity of the contamination increases the level of uncertainty and perceived risk rises.

UNCERTAINTY

The level of uncertainty or risk associated with a hazard or contamination is influenced by the amount of knowledge people have about it. When a contamination problem becomes known, there is generally a period of heightened uncertainty during which the magnitude and character of the problem are researched and documented. During this period of heightened uncertainty, risk is much greater, therefore value discounts are greater. As research progresses, and a better understanding of the magnitude, character, and possible solutions to the problem is reached, uncertainty decreases. The market's ability to predict the possible value effects and the probability of whether those effects will be realized become more certain. Even though the risk of a catastrophe may be high, the degree of uncertainty about it is low at this point, and an analyst will be able to calculate the value changes resulting from the hazard more easily. Consequently, time is an important consideration

9. Aaron Wildavsky, "No Risk Is the Highest Risk of All" *American Science* (Vol. 67, 1979): 35.

in determining the degree of uncertainty.[10]

PERCEPTION OF RISK

Risk can be differentiated based on whether it is real or perceived.[11] The effect of real risk can be quantified with a high degree of confidence. For example, a water hydrologist's statement concerning risk might be that "The site generating water contamination has been contained and there is no more migration of contaminating substances moving through the soil." An environmental engineer may estimate that the cost to soil farm a site that has a leaking underground storage tank will be $15,000.

Perceived risk is the risk seen by the public in the marketplace. It is an individual's disinclination to believe that a source of contamination is safe.

The perception of risk varies with the nature of an event's cause. For example, the risk associated with illness from drinking well water contaminated by an undetected source such as a landfill or LUST is greater than the risk associated with living downriver from a dam because the former is involuntary while the latter is voluntary.

Another factor that affects the level of perceived risk is whether the source of risk might result in a catastrophic accident. For example, the level of risk associated with a nuclear reactor is higher than the risk of living in a home where radon gas is present.

Finally, the level of risk associated with contamination varies according to the level of familiarity with the particular contamination. Because people are relatively unfamiliar with PCBs, greater risk is associated with them than with smoking cigarettes. Ironically, however, many more people die every year from the results of smoking than from the results of PCBs. This illustrates the discrepancy between real and perceived risk.

Another example of the difference between real and perceived risk is revealed in research that the author recently concluded involving a sanitary landfill. From a scientific standpoint, the landfill was contained. However, in a survey of 25 lending institutions in the Pacific Northwest in which the precise scientific status of the landfill was explained, 50% of the lenders indicated they would not make a loan on an adjacent property for an average of ten years into the future.

RISK AMPLIFICATION

As previously illustrated, the level of perceived risk can vary depending on the nature of the event; that is, whether it is involuntary, unfamiliar, or catastrophic.[12] In addition, the same type of risk can vary depending on certain "amplification" traits, including media exposure. If an incident receives a great deal of television, radio, or newspaper exposure, its level of risk may be elevated in comparison with a similar incident that receives little, if any, media exposure.

A second amplification trait is the extent to which blame can be attributed to a person or entity; that is, the extent to which the entity or person responsible for the event acted carelessly, incompetently, or irresponsibly. One of the reasons that the Exxon Company was so

10. For a good discussion of the difference between uncertainty and risk from a financial standpoint see Lawrence Schall and Charles Haley, *Introduction to Financial Management*, 6th ed. (New York: McGraw Hill, 1990), 173–218 and 326–361.

11. Paul Slovic, "Perception of Risk," *Science* (Vol. 236, 1987): 280–285.

12. Ibid.

severely criticized after the Prince William Sound oil spill was because the press revealed that Captain Hazelwood was below deck, drunk (carelessness); that the third mate was piloting the ship (incompetence); and that Exxon had allowed Captain Hazelwood to pilot the Exxon Valdez in spite of his rather questionable background (irresponsibility).

A final factor that affects the amplification of perceived risk for a particular incident is the innocence of the victim. If a victim is innocent (e.g., an office worker in an asbestos-contaminated building), the level of risk associated with that property can be expected to be much greater than in a situation in which the victim is not innocent (e.g., a homeowner knowingly living in a house that has asbestos insulation and asbestos-wrapped hot water lines).

STIGMA AND MARKETABILITY

The value of real estate is based on the premise that it is marketable. A number of people take part in the transaction process who can have an influence on a property's marketability. Different sets of buyers may act differently. For example, the buyer of an apartment building located adjacent to a sanitary landfill may want a price discount or an indemnification agreement from the operator of the landfill to offset risk. If the buyer is not able to obtain these concessions he or she may not be willing to acquire the property. On the other hand, some segments of the real estate market are more willing to accept risk—for example, companies in which a byproduct of the production process is soil contamination. Transactions involving the acquisition and disposition of oil refineries, oil terminals, and tank farms when the transaction is on a "within industry" basis are examples of situations when risk would not significantly concern the buyer.

Buyers and intermediaries in the acquisition process perceive risk differently. While an individual may be willing to buy a property that is contaminated or has the possibility of being contaminated, the lending institution may not be willing to provide financing for the acquisition.

QUANTIFYING STIGMA

In a perfect world, stigma would be quantified on a direct basis. We do not operate in a perfect world, however, and therefore we must frequently rely on indirect measures. In a perfect world, or alternatively with a good-quality set of market data, stigma might be expected to have the following influences on market behavior as measured through the income approach.

- *Rent*—For a stigmatized property rent could be less than for the same property unstigmatized. This is a simple market demand phenomenon.
- *Occupancy*—Occupancy would also be expected to be less as a result of such stigma.
- *Expenses*—For such a property, higher operating expenses could be expected for such items as marketing to maintain rent and occupancy levels and professional services to determine whether contamination persists.
- *Rate*—The capitalization or discount rate could be influenced by lending institutions' desire to alter the loan-to-value ratio, interest rate, or term of the loan to offset perceived risk.

For many properties, though, the stigma influence may be so subtle that its effect would be completely explained by the error term in our

analysis.[13] However, careful multiple regression analysis may measure the stigma influence if such an influence does in fact exist.

INDIRECT APPROACHES

A number of indirect approaches to quantifying the effects of stigma are potentially useful. One of these is contingent valuation, which is a survey research technique used to determine the value of noneconomic goods (e.g., the value of a public beach).[14]

A second technique is trade-off (conjoint) analysis, which can be used to determine the relative importance of variables that contribute to the value of a home. Trade-off analysis is another survey research technique that quantifies, through nonparametric statistical techniques, the relative utility (or value) of the individual attributes that compose a product.[15]

CONCLUSION

Property that is directly or indirectly affected by sources of contamination may suffer a diminution in value from two factors. The first is real risks that can be scientifically quantified, such as the cost to cure or manage a risk. An additional factor is perceived risks, which are much more difficult to quantify. The level of perceived risk varies with the characteristics of the contamination, such as whether it has catastrophic effects, is unfamiliar, or is involuntary. Risk also varies depending on the level of media exposure, whether blame can be attributed to an individual or entity, and the innocence of the victim.

The challenge of quantifying the damaging effect contaminants have on real estate has only recently, since the passage of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA or SuperFund), become a major valuation problem. This article has indicated the complexity of the issue and has suggested some things to observe. In addition, this article has offered methods that may prove useful in determining the impact of various forms of contamination on real property value.

Risk varies depending on the level of media exposure, whether blame can be attributed to an individual or entity, and the innocence of the victim.

13. Gene Dillman, speaking at the February 28, 1991, meeting of the Real Estate Counseling Group of America, Inc., in Orlando, Florida.
14. Robert Cameron Mitchell and Richard T. Carson, "Using Surveys to Value Public Goods: The Contingent Valuation Method," *Resources for the Future* (1988), 2–17.
15. Gilbert A. Churchill, *Marketing Research: Methodological Foundations* (Chicago: Dryden Press, 1987), 364–376.