

Adjusting Environmental Case Study Comparables by Using an Environmental Risk Scoring System

by Richard J. Roddewig, MAI

Comparables, Case Studies, and Stigma Adjustment Factors

As frequently mentioned in this column over the past few years, environmental risk/stigma is typically estimated based upon case studies of other properties affected by environmental risk.^{1,2} The case study is not a "comparable" in the way we as appraisers typically think of comparables. It is not intended, for example, to provide an indication of price per square foot or price per acre that can then be applied (after adjustments) to the area of the property being appraised. Instead, the case study becomes the source of the "adjustment factor" for stigma that we apply to the market value of the appraised property, disregarding contamination³ to estimate the market value of the property when considering the environmental contamination and associated risks affecting it.

But how do we as appraisers, based on the case study information, arrive at the appropriate stigma adjustment factor for the property being appraised? We typically use a three-step process. First, we investigate the case study situation to determine the market-based stigma affecting the case study property. Second, we analyze the sources and causes of the stigma affecting the case study property. Third, we analyze the property being appraised to determine if the same sources of stigma are present in the market situation in question. This is done by comparing and contrasting the case study and the property being appraised

to determine the appropriate stigma adjustment factor to apply to the market value, disregarding contamination and environmental risks.

Using Rating or Scoring Systems to Compare Risk/Stigma

An earlier Environment and the Appraiser column suggested evaluating various types of environmental risks according to a low, medium, or high rating system to compare the risks associated with the case studies to those risks associated with the property appraised. The same article mentioned that many institutional real estate investors have developed "standardized due diligence checklists and evaluation forms that allow them to analyze the environmental risks on properties and portfolios." Some have even been "heading toward a numerical scoring or rating system for environmental risks."⁴

While evaluating environmental risk/stigma as low, medium, or high may be enough in many, if not most, situations to arrive at an appropriate stigma conclusion, there may be times when more precision is necessary. Using a risk/stigma scoring system can provide that additional precision. It allows the appraiser to evaluate case studies more thoroughly, comparing one against another and against the risks/stigma involved in purchasing or owning the property being appraised. Using a scoring system may allow an appraiser to select a specific numerical stigma percentage with more confidence. It may also

1. See, for example, Richard J. Roddewig, MAI, "Classifying the Level of Risk and Stigma Affecting Contaminated Property," *The Appraisal Journal* (January 1999): 98-99; and Richard J. Roddewig, MAI, "Choosing the Right Analytical Tool for the Job," *The Appraisal Journal* (July 1998): 324.

2. *Ibid.*, 324.

3. True uncontaminated "comparables" as traditionally defined are used to estimate the market value of the appraised property disregarding contamination. To then arrive at the market value considering the contamination situation and accompanying environmental risks, if any, "adjustments" are made to the value disregarding contamination and risks. Adjustments to the uncontaminated comparables may be necessary for such items as remaining costs of environmental investigation and remediation, insurance or other administrative or legal costs, or for stigma.

4. Richard J. Roddewig, MAI, "Classifying the Level of Risk and Stigma Affecting Contaminated Property," *The Appraisal Journal* (January 1999): 99.

allow the appraiser to give more or less weight to some risk factors by comparing them to other risk factors. In a marketplace constantly dealing with risks, risk/stigma factors can change over time and be more or less significant depending upon a variety of property-specific and market-specific factors.

Elements of an Appropriate Scoring System

A proper scoring system has three essential characteristics:

- first, it contains a list of the potential sources and causes of risk/stigma;
- second, it specifies a score—assigns points—to be applied when considering each of the potential sources of risk/stigma; and
- third, it is applied consistently from one case study to the next case study being evaluated.

There are a wide variety of possible scoring system models, and appraisers have considerable flexibility to devise one that works best for them. The key to making such a system effective is to devise one that considers all of the potential sources of stigma, and then applies the scoring system consistently when evaluating case studies and the property being appraised.

Using a Scoring System: A Hypothetical Example

Consider the following hypothetical situation to understand how a numerical scoring system can be of significant help.

Hydrocarbon contamination from leaking underground storage tanks (removed three years earlier) on a vacant site being appraised has already been remediated to the extent required by a state environmental protection agency as part of a state-approved remedial action plan. However, the state requires that on-site monitoring wells must remain in place on 50% of the site until groundwater quality levels reach a specified level. Precisely when that will occur is not clear, but given present trends from most recent sampling, groundwater quality will reach acceptable levels in the next three to five years. The past property owner has accepted responsibility for all ongoing monitoring and sampling costs, and has provided an indemnity against additional remediation costs for all future owners. The state has an established program that is working well and will provide a “no further action” letter to potential purchasers.

You investigate ten other contaminated property sales and conclude the one you are appraising is most like the three that show a stigma adjustment factor in the marketplace between 5% and 12%, a relatively low level of risk/stigma. What do you do? Provide a range in market value considering the risk/stigma situation that is 5% to 12% lower than the market value disregarding the environmental situation? Select the midpoint of the range? Subjectively analyze the three most significant case studies and decide which one should be given the most weight?

If the purpose of the assignment and the use to which the appraisal will be applied require more precision than a range in value, you may prefer to compare and contrast the three case studies to your property’s situation and arrive at a specific percentage stigma adjustment factor and conclusion. A scoring system may help you achieve that goal.

Assume that the scoring system you use classifies risk/stigma as either low, medium, or high and within each classification assigns the following numerical scores: from 0 to 33 for a low level of risk; from 44 to 66 for a medium level of risk; and from 77 to 99 for a high level of risk. For example, a score of 4 (the medium category) for the risk of additional administrative costs means that for that particular item, this property is at the low end of the medium range for stigma/risk.

Total scores in the low stigma range would be between 0 and 33 points, in the medium range between 44 and 66 points, and in the high stigma range would be between 77 and 99 points. Potential scores and stigma percentage ranges are classified as follows:

Low Stigma	
Total Point Range	0 to 33 points
Indicated Stigma Level	0 to 15%
Medium Stigma	
Total Point Range	44 to 66 points
Indicated Stigma Level	15% to 40%
High Stigma	
Total Point Range	77 to 99 points
Indicated Stigma Level	40% to 100%

Your analysis of the case studies indicates that they sold at prices between 5% and 12% less than their price/value regardless of their environmental situation. By separately analyzing the risk/stigma

characteristics of each case study and assigning a risk/stigma score to each source and cause, you are then in a position to compare the case studies to each other and to the property you are appraising.

Your analysis results in the following stigma/risk score sheet (Table 1).

As shown in the score sheet, you have concluded that the appropriate stigma adjustment to apply to the market value of the property appraised is 6%.

Note that in the above scoring system, each source and cause is given equal weight. It may be that your experience with contaminated or remediated properties indicates that one or more of the sources and causes of potential stigma is given more or less weight by buyers in the marketplace than others sources and causes. In that case, it may be necessary when comparing the scores to also consider the relative weight that should be given to each case study based upon the weight the buyer places on its sources and causes of stigma. Alternatively, it may be possible to assign more points to those sources and causes that are given more weight by buyers in the marketplace.

The dates of sale of each of the case study properties compared to the date of valuation for the subject property may also be important. If each of the case study properties (and the subject property) has

been assigned a risk/stigma score as of its particular date of sale, and the marketplace has generally shown more comfort with buying, selling, and financing properties affected by environmental risk since the date of the particular case study sale, then the range of indicated stigma factors from the case studies may also have to be lowered to reflect changes in market conditions since their dates of sale.

Conclusion

Over the past 15 years, the appraisal profession has made great strides in its ability to understand and analyze the impact of environmental risks on market value. Utilization of case studies has become an accepted technique for deriving a "stigma adjustment factor" to apply to market value regardless of environmental risk factors.

However, the analytical tools necessary to assist us in properly evaluating risk/stigma case studies are continuously evolving. A risk/stigma score sheet can be a helpful tool, as long as it includes all of the sources and causes of stigma, and is consistently applied by each appraiser using the technique. The score sheet can be applied to each case study analyzed as well as to the subject property, or, if you prefer, to one or more case studies, or only to the property appraised.

Table 1 Sample Stigma/Risk Score Sheet

Risk/Stigma Source/Cause	Case Study 1			Case Study 2			Case Study 3			Subject Property		
	Lo	Med	Hi	Lo	Med	Hi	Lo	Med	Hi	Lo	Med	Hi
Additional site investigation costs	1			2			2			2		
Additional remediation costs	0			2			2			0		
Additional environmental monitoring costs	1			2			1			1		
Additional legal/administrative costs	0			1				4		2		
Inconvenience during investigation/remediation	1			2				4			4	
Adverse change in regulations	1			0			0			0		
Higher vacancy or lower rents from tenants	0			2			1			0		
Difficulty in obtaining mortgage financing	2			1			3			1		
Third party claims or additional insurance costs	1			3				4		1		
Additional future marketing costs to resell	1			2			2			1		
Additional marketing time to resell in future	1			2			3			1		
Total points		9			19			26			13	
Market stigma factor		5%			8%			12%			6%	

At this time, there is no universally accepted scoring system, nor does there necessarily need to be one common model. The score sheet simply provides a systematic and consistent process for arriving at an appropriate and supportable stigma adjustment factor. As long as the case study data is reliable information derived from the marketplace is accurately reported, properly investigated, and appropriately confirmed, the appraiser can apply any one of many tools. The score sheet is the only possible tool for comparing and adjusting the market-derived stigma indicators to the appraisal situation at hand.

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