Assessing Harmful Factors

A saying in the field of journalism is that "only bad news is good news" or that "bad news sells" in the media marketplace. In a similar fashion the recent growth of environmental and tort (i.e., wrongful harm) laws in the United States has resulted in the apparent popular merchandising of a number of "deleterious condition models" and negative valuation methods for the assessment and appraisal of real estate related risks.

"Deleterious condition models" purport to evaluate hundreds of harmful environmental factors negatively impacting real estate from:

- natural causes (flood zones, landslides, soil liquefaction);
- man-made substances and emissions (toxic sites, asbestos, lead-based paint, electromagnetic fields, radon);
- building environments (sick building syndrome, construction defects);
- public works projects (permanent and temporary takings);
- market stigma from social conditions (crime scenes, the place of residence of sexual offenders).

An Alternative Model for the Valuation of Affected Properties

The Growth of Negative Valuation Models

"An easily understood, workable falsehood is more useful (marketable) than a complex incomprehensible truth."
— Murphy's Laws

By Wayne C. Lusvardi

There is a veritable growth industry in negative real estate valuations. Such negative valuations attempt to recover clean-up costs and punitive damages in toxic tort lawsuits against large corporations, obtain damages from public agencies in airport or freeway noise class action suits, compensate for construction defects from new home builders, pay for the replacement of homes proximate to so-called hazardous waste sites, and to obtain lower assessed valuations for property tax purposes as a result of any of the above. To apply the above proverb to the current practice of real estate appraisal, "bad values sell" in our new liability culture.

These new risk assessment models and negative valuation methods for the appraisal of real estate contain a number of overlooked problems such as:

1. Potentially harmful conditions are everywhere and in everything. By logical extension, if everything is harmful, nothing is. Within the framework of harmful evaluation models and negative valuation methods truly there is little that could not be called a deleterious or harmful condition.

2. Harmful condition valuation models employ only single entry accounting of debit items such as remediation costs and accompanying "market resistance" or "stigma." The problem with this approach is that external conditions impacting real estate have inseparable positive and negative aspects and are lopsidedly in favor of the positive. Benefits are often large, imminent, and likely to recur while costs are often small, speculative, remote in time and typically projected by extrapolation.

3. The cost to remediate a harmful condition does not reflect "market value" between a "willing informed emitter" and a "willing informed recipient" either of whom hypothetically can alter their circumstances by a price mechanism as specified in the legal definition of market value. The concept of markets implies the ability to alter one's circumstances by education, avoidance, prevention, or mitigation. As such a deduction for the costs to remediate harmful conditions or stigma does not reflect market value in the legal and accepted definition of the term.

4. Under new Federal evidentiary law, purported harmful conditions must first be proven by the scientific method to cause material damage before being adjudicated for compensation in a court of law (Daubert v. Merrell Dow Pharmaceuticals, 1993). Most so-called harmful conditions, substances, or emissions impacting real estate have not been proven to be harmful to human health or safety.

5. A determination of the "relevant parcel" (i.e., larger parcel) for evaluation is often omitted in negative valuation models. The impacted parcel is assumed to be harmed without considering the positive impacts on benefited parcels. Moreover, an impacted parcel and a mitigated or benefited parcel form an economic "complement" not an economic "substitute" that reflects market value.

6. Harmful condition assessment models don't consider that the market uses insurance to mitigate the occurrence of many risks (Freeman; Britt).

7. Harmful condition models evaluate temporary episodic risk to the neglect of long-term market trends. Short-term losses may be recovered in the long run by natural market cycles.

8. Harmful condition models and negative valuation methods are deceptively simple and thus are seemingly more appealing than complex but more realistic valuation models.

This article provides an alternative model for the valuation of potentially harmful environmental conditions. This model is intuitively simple, market-based, considers both what is harmful and beneficial, employs double entry net impact accounting, comports with accepted science, and fits with traditional real estate investment risk analysis. In the interest of brevity, a full theoretical explanation of the alternative trade-off model described below has not been attempted.

The Risk Trade-Off Model

The Risk Trade-Off Model elaborated upon more fully in the body of this article is based on the outline shown in Figure 1, below:

The Risk Tradeoff Matrix

Figure 1

Class	Risk	Reward	Degree of Risk	Risk Probability	Perception	Risk Rate
I	High	High	Reasonable	Varies	Phobia	10%
II	High	Low	Intolerable	Varies	Stigma	›10%
III	Low	High	Acceptable	Varies	Phobia	5% - 10%
IV	Low	Low	Negligible	Varies	Phobia	5%

Risk/Reward Tradeoff. Living in a technological society presents a number of inescapable tradeoffs between risks and rewards, losses and gains, costs and benefits, opportunity and danger. We drive automobiles to work for the rapid form of transportation it provides, without giving much thought to the small daily potential risks of loss of life involved. We make certain that our children have whooping cough vaccinations, despite the miniscule risk of death involved. We increasingly rely on wireless (cellular) communications and don't consider electromagnetic waves from such devices a health hazard because they emit considerably less energy than a light bulb.

Some people live or farm in flood plains and are willing to pay for flood hazard insurance for the trade off of lower land costs or availability of water for farming, full well knowing that when the 100-year flood cycle comes their property may suffer damage. Any model for evaluating risks relating to real estate must take into account this tradeoff or exchange dimension of costs and benefits. This tradeoff equation has traditionally been measured in real estate by a risk versus reward investment analysis. The underlying assumption of the tradeoff concept is that risks and rewards are inseparable and that markets maximize rewards and minimize risks (see Figure 2, page 25).

Levels of Risk Tradeoff. Like climbing a ladder where there is a tradeoff between height and safety, there are levels of risk tradeoff from familiar risks, to low, prospective, and substantial risks. Varying levels of risk require a different risk policy. High risks with low accompanying rewards are usually considered as "intolerable risks." Low risks associated with high rewards usually are thought to be "acceptable risks."

Where high risks are matched with high rewards the public typically demands that the risks be kept "as low as reasonably possible." Low risks that are accompanied by low rewards often are considered to be "negligible risks" that requires only benign neglect (see

Figure 2). Intolerable and reasonable risks typically are mitigated with insurance. Acceptable and negligible risks are not frequently insured because they represent low or non-risks.

Intuitive Risk. What the public typically understands about risk is often summarized into shorthand proverbs, recipe knowledge, or rules of thumb that guide everyday market decision making without any formal education or scientific knowledge. A risk evaluation model must be translated into the language of these intuitive guidelines and informal systems of knowledge.

For example, "acceptable risks" are usually described in terms of the proverb "waste not/want not." In other words, some rewards are worth pursuing despite the high risks. "Intolerable risks" are usually described in terms of "better safe than sorry." "Reasonable risks" are frequently described by the public as risks where if "nothing is ventured, nothing is gained." "Negligible risks" are often described as taken "with a grain of salt;" meaning they are considered as small as a grain of salt (see Figure 2).

Risk Perception/Regulation. Another factor in the tradeoff model is perception or misperception of risk. Accurate perception of the probability of future risk is typically termed "stigma." The opposite of stigma is "phobia" where there is an irrational misperception of harm without any rational basis. Fair market value real estate valuations can consider stigma but cannot consider phobia. This is because the concept of phobia assumes irrational perception, panic, or fear of risk rather than rational and knowledgeable perception. Contrary to current popular thinking in the field of real estate appraisal, most environmental conditions evoke phobia not stigma (Lewis).

Risk perception in a technological society is dependent on the reasonableness of the regulation of risks. Regulation where there is no real risk can create its own stigma. Where some risks such as flood hazard zones are highly regulated, any negative market reaction to properties located in such zones beyond that already reflected in land sales prices would be phobic because regulation and mandatory flood insurance minimizes the risk of loss.

Where risks have been highly regulated by environmental protection laws and tort laws without any proven likelihood of harm to human health or safety, the real risk becomes the threat of a lawsuit or the imposition of a fine, exaction, or excise tax. As H. W. Lewis, Ph.D., professor of physics at the University of California at Santa Barbara has stated, the reason for remediation or removal of most environmental substances or conditions is "fear of litigation," not fear of harm. Such a condition may be termed "regulatory stigma."

The implication of the Tradeoff Model is that we should avoid squandering huge sums today to avert distant or highly speculative or improbable threats.

Risk Tradeoff Examples. There are few real estate related risks that would fall into the category of a Phase I high risk/high reward condition in the Risk Tradeoff Model. Living in a flood plain is a high risk/high reward condition but it is mitigated by flood insurance and long cycles between major floods. Most real estate related risks fall into the Class III & IV category of negligible or acceptable risks. The highest statistical risks involving real estate are house fires and home accidents. House fires are sometimes attributable to the physical condition of real estate but are often insured (Breyer).

The popular misconception is that a chip of lead-based paint, a particle of asbestos from insulation, a molecule of radon gas from soil, one miligauss of electrical energy from distant power transformers, or the mere proximity to the underground migration of minute concentrations of toxic substances, represent significant risks (Bate; Breyer; Foster; Gots; Lewis; Mazur; Moore; Wildavsky). There is an overreaction to man-made carcinogens and emissions, and unconcern with immensely greater natural carcinogens and human lifestyle mistakes and misdeeds.

An example of an acceptable risk often taken by the public with real estate is installing asbestos insulation because of its irreplaceable life saving and fire retardant properties compared to its miniscule hypothetical risk (Moore). However, because asbestos in buildings can lead to lawsuits it may have a phobic effect on real estate values. Examples of intolerable risks are gross construction defects or negligence in building on unstable land (see Figure 2). Examples of negligible risks are radon (Moore) and freeway noise.

Risk Rate. All of the above factors measure risk in qualitative-categorical terms. How should we quantitatively measure risk? The method that real estate economists, bankers, and appraisers use in dealing with future contingencies is the mechanism of financial discounting, such as annuity or compound interest. With an annuity we make small payments (costs) now to reap greater sums (rewards) in the future through the power of compound interest.

The value of something is measured higher in the present than in the future (a bird in the hand is worth two in the bush). Historical rates of return for bank deposits, savings accounts, and investment returns have hovered in the range of 5 percent to 10 percent per year. Low investment risk has been associated with low risk rates of around 5 percent. High

risk has been associated with rates of 10 percent or higher. Moderate risk has been in the 5 percent to 10 percent range (see Figure 2).

Applying the Model. The application of discount rates to measure risk must consider the factors of time and probability. We are typically willing to pay more to avoid risks that are imminent in time than those that we must deal with that are far away. Using a grand example from physicist H.W. Lewis in his book Technological Risk, let's assume that the purported risk of carbon dioxide build-up in the air (global warming) is a real rather than a perceived threat to the entire world.

This presumed threat would harm real estate values by raising the level of the oceans, increasing the risk of forest and brush fires, requiring more energy to cool buildings, result in more and longer draughts requiring tax increases for huge water and flood protection projects, require a massive relocation of population near to places of work to avoid driving automobiles, etc. Lewis estimates that global warming would result in a catastrophic one-third loss of the world's estimated gross domestic product of $30 trillion (GDP 1996). In other words, the loss would be $10 trillion, but it is not expected for 200 years.

Employing a 10 percent discount rate used by the U.S. Federal Office of Management and Budget (OMB) to reflect the high future risk involved, the resulting present worth of the cost to avert this hypothetical world tragedy today would be a one-time lump sum of only about $50,000. We are willing to accept this small speculative risk in return for the trillions of dollars that personal mobility from the automobile contributes annually to the economy and to real estate values. Albeit this personal mobility comes at the cost of some lives (mitigated by insurance) and the unpaid price of irritating pollution that we are willing to tolerate to some degree.

Using the Risk Tradeoff Model, most risks associated with real estate equate to a small or zero sum in present worth dollars. This is corroborated by the impartial scientific literature that shows that most man-made environmental risks associated with real estate are so improbable that they are effectively zero (Bate; Breyer; Foster; Gots, Lewis; Mazur; Moore; Wildavsky). Natural disasters or man-made failures are often insurable and/or the long-term rewards greatly exceed short-term losses.

The implication of the Tradeoff Model is that we should avoid squandering huge sums today to avert distant or highly speculative or improbable threats. However, this "good news" won't sell engineering risk assessments, appraisals using exotic valuation methods, environmental legal services or justify regulatory budgets. Nor will it eliminate the stigma

attributable to the threat of lawsuit or the imposition of a fine, impact fee, or excise tax for over-regulated environmental risks (i.e., regulatory stigma). But it may offer a more realistic alternative tool for the evaluation of the impact of environmental risks on real estate.

By combining all of the above-described factors into a graphically depicted model, the contingency table emerges: (see Figure 2).

A Stopped Clock Is Right Twice A Day

The Risk Tradeoff Model focuses on long-term risk while many current risk assessment models concentrate on an episodic one-time event such as the reaction immediately prior to or after a landslide, earthquake, flood, toxic tort lawsuit, crime, etc.

By focusing on a crisis event the impact of the harmful condition on the real estate market is distorted. This tunnel vision approach is similar to measuring the impact of a temporary correction in the stock market that will naturally recover.

To value the imputed temporary value diminution on real estate from an environmental condition that the natural trends of the market will eventually compensate for may be misleading, unless the condition lingers after the market has recovered. Moreover, if the market already places a discount on real estate for latent environmental conditions (i.e., flood plains), how can it be claimed there is an additional diminution or "stigma" upon the activation of such a condition (i.e., a flood event)?

Media, environmental protection regulations, and litigation often distort and magnify the true risks of environmental conditions while the market minimizes and mitigates such risks. Many risk assessment models used in real estate appraisals fail to consider confounding variables such as the effects of media, litigation, or environmental activism, and the effects of intervening market mechanisms such as perceptual minimization, insurance, government benefit programs, and other mitigation measures (see Figure 3).

Real Estate Environment Risk/Reward Tradeoff Matrix

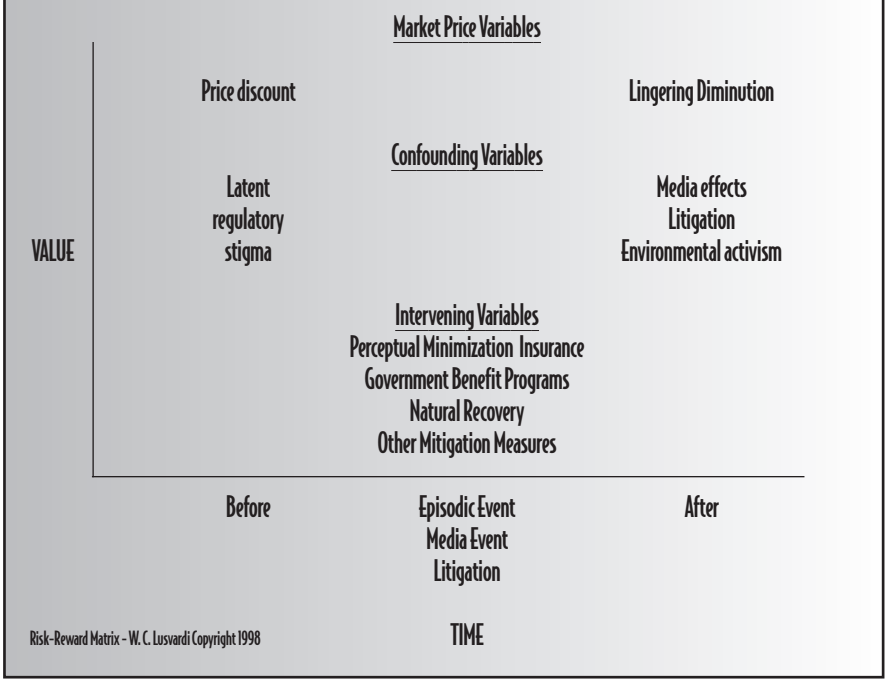
Figure 2

	High Reward	Low Reward
High Risk	(I) High Risk/High Reward Rule: "Nothing Ventured/Nothing Gained" *Risk Level: As Low As Reasonably Possible Risk* Examples: flood hazard zone; airport, dam proximity (High Regulation: phobia) Risk Rate: 10%	(II) High Risk/Low Reward Rule: "Better Safe Than Sorry" *Risk Level: Intolerable Risk* Examples: landslide, gross construction defects (High Regulation: stigma) Risk Rate: >10%
Low Risk	(III) Low Risk/High Reward Rule: "Waste Not/Want Not" *Risk Level: Acceptable Risk* Examples: electromagnetic fields, building asbestos, lead based paint, toxic waste site (High Regulation: phobia) Risk Rate: 5% - 10%	(IV) Low Risk/Low Reward Rule: "Take With A Grain of Salt" *Risk Level: Negligible Risk* Examples: radon, freeway noise (High Regulation: phobia) Risk Rate: 5% or less

Risk-Reward Matrix - W. C. Lusvardi Copyright 1998

Distorting and Mitigating Factors in Real Estate Risk Events

Figure 3



Risk-Reward Matrix - W. C. Lusvardi Copyright 1998

Taking cues from the media and regulation, the public perceives the presence or absence of risk, not its magnitude (Viscusi). The overreaction to negligible risks retards the sort of economic progress that has historically brought about both health and material well being. But real estate appraisers are held to a higher professional standard, and should be required to impart that the true net risks of most environmental conditions on real estate are small, nonexistent, are too far away in time to amount to much in monetary terms, or are already included in market real estate prices.

To do otherwise would result in the loss of professional status for the appraisal industry. Much like the "no project influence rule" that governs property appraisals for public works projects, appraisals of properties with perceived risks should disregard any influence on property values after the situation becomes a media event (media influence rule) or a litigated event (litigation influence rule).

Marketing Fashionable Nonsense

Some of the recent advertised models for the assessment and valuation of environmental risks impacting real estate have been incorporated into professional appraisal seminars despite their lack of peer and public agency review. These models are grossly inconsistent with economic theory and appraisal principles, accepted impartial science, just compensation law, and newer case law regarding the adjudication of property valuation cases involving scientific issues.

Government agencies and public utilities need to adhere to the principle of "caveat emptor" (buyer beware) in shopping for consultants for real property assessments and valuations involving environmental conditions. Risk assessment and valuation models that masquerade as appraisal theory but offer a cafeteria approach for the pre-concluded negative evaluation of multiples of hundreds of environmental risks are basically for marketing of professional services or legal advocacy purposes, not for impartial real estate appraisal. ■

Sources Consulted

Roger Bate, ed., *What Risk? Science, Politics, and Public Health* (Oxford: Butterworth, 1997).

Stephen Breyer, *Breaking the Vicious Circle: Toward Effective Risk Regulation* (Cambridge, Mass.: Harvard University Press, 1993).

Scott A. Britt, *Why The Real Estate Market is Increasingly Relying on Environmental Insurance* (www.ecsunderwriting.com., undated).

Susan L. Cutter, *Living with Risk* (New York: Edward Arnold, 1993).

Baruch Fischoff, et. al., *Acceptable Risk* (New York: Cambridge University Press, 1981).

Kenneth R. Foster, et. al., editor, *Phantom Risk: Scientific Inference and the Law* (Cambridge: MIT Press, 1994).

Paul K. Freeman, *Managing Environmental Risk through Insurance* (Kluwer Academic Pub. 1997).

Ronald E. Gots, *Toxic Risks: Science, Regulation, and Perception* (Lewis, 1993).

H. W. Lewis, *Technological Risk* (New York: Norton, 1990).

Howard Margolis, *Dealing With Risk: Why The Public and the Experts Disagree on Environmental Issues* (Chicago: University of Chicago Press, 1996).

Allan Mazur, *A Hazardous Inquiry: The Rashomon Effect at Love Canal* (Harvard University Press, 1998).

Cassandra Chrones Moore, *Haunted Housing: How Toxic Scare Stories are Spooking the Public Out of House and Home* (Washington, D.C.: Cato, 1997).

Kenneth Sewall, *Tradeoff Between Cost and Risk in Hazardous Waste Management* (Garland Pub., 1990).

Alan Sokal and Jean Brichmont, *Fashionable Nonsense: Intellectuals' Abuse of Science* (New York: Picador, 1998).

W. Kip Viscusi, *Fatal Tradeoffs: Public and Private Responsibilities for Risk (New York: Oxford University Press,* 1992).

Aaron Wildavsky, *But Is It True? A Citizen's Guide to Environmental Health and Safety Issues* (Cambridge: Harvard University Press, 1995).

Wayne Lusvardi is Senior Real Estate Representative for the Metropolitan Water District of Southern California. He holds a bachelor's degree from Aurora University in Illinois and a certificate in real estate appraisal from the UCLA School of Business, Management and Engineering.