
Three Rules for Real Estate Damage Valuation:
Deduction, Adduction or Reduction?

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Real estate damages are a potential growth business. In the lottery-type world of modern tort law, there is believed to be a latent market for nearly endless lawsuits to remedy countless environmental hazards, both real and imaginary. However, neither law or real estate appraisal has thoroughly clarified what damage valuation methodologies are applicable under tort law, condemnation law, regulatory takings law, and inverse condemnation law in various political jurisdictions. The real estate industry has proposed a universal reductionistic framework for all real estate damage valuations that is inconsistent with accepted law and economic principles, and is prone to the criticism that it relies on "junk science." This paper is to survey and clarify the various real estate damage valuation methods in view of the current methodological chaos in such cases.

The real estate industry has traditionally relied on the three conventional approaches to property valuation termed the Cost Approach, Sales Comparison Approach, and the Income Approach. However, these valuation methodologies have been incorporated into damage law under different terminology and computation formats than the three conventional methods of appraisal. Two rules predominate and have mostly been applied to damage situations involving condemnation by public entities: the Federal Rule (or Before and After Rule) and the State Rule (or Value of the Take Plus Damages Rule).

The Federal Rule tries to solve the damage measurement problem by using "deductive logic;" the value after the damage is "deducted" from the value before the damage to arrive at an estimate of damage compensation. The Before and After Rule (or Federal Rule) is the dominant damage rule under eminent domain law in twenty six state jurisdictions and is also the accepted measure of damages under tort law.

The State Rule, adopted in twenty four jurisdictions for eminent domain purposes, uses "adductive logic" to try and solve the damage measurement problem by "adding" the value of the damaged portion of a property with the value of the damages to the remainder to estimate total damage compensation.

There is a newer rule, which we will term here the Reductive Rule, which, to our knowledge, has not been adopted by any political jurisdiction for condemnation or tort law purposes.

For the purpose of this paper the term "Deductive Rule" shall be substituted for the Federal Rule, the term "Adductive Rule" substituted for the State Rule, and the term "Reductive Rule" shall be used to describe some of the newer approaches to damage compensation. These three logic rules are analogous to the Sales Comparison Approach (deductive method), Cost Approach (adductive method), and the Income Approach (reductive method) conventionally used in real estate appraisal. Each of these rules is not based on pure deduction, adduction, or reduction, but the name for each rule stems from their central mathematical operation (e.g., subtraction, addition, reduction).

Deductive Rule (Federal Rule). The Deductive Rule, also known as the Federal Rule, Before and After Rule, or "Difference Between the Fair Market Value of the Property Before and After the Damage Rule," is misnamed because it is used by both the Federal government and some state jurisdictions to

guide the amount of compensation for partial property acquisitions resulting from damages for public works projects.1 The Deductive Rule is the simplest of the rules to understand because it literally follows a "before and after" methodology to estimate compensation. The underlying logic of the Deductive Rule is obviously "deductive logic."2 Under deductive logic, damages are estimated by reasoning from the general to the particular. In the eminent domain context, the Deductive Rule translates into a formula where the after value of a property is subtracted, or deducted, from the before value of the property to arrive at the total just compensation due a property owner for damages as follows.

Deductive Rule Formula or Federal Rule (Formula: Vb-Va = JC)
Value Before Taking
$XXXX
Minus Value After Taking
$YYYY
Equals Just Compensation
=$ZZZZ

This rule might also be called a lump sum analysis because it relies on aggregate level market data to arrive at a lump sum figure that represents both the value of the part taken plus any damages to the remainder of a property. Under the Deductive Rule you cannot itemize the value of the part taken, damages, or offsetting benefits. The value of such items is "lumped" in together as one number.

Two weaknesses of the Deductive Rule include its inability to exclude offsetting benefits from the damage calculation and to exclude legally noncompensable damages in the after value of a property. Additionally, under the Deductive Rule it is possible to arrive at zero compensation especially in relatively small easement acquisitions where the real estate market does not recognize any diminution for such encumbrances; or where it is impractical to measure such diminution from limited market data.

A strength of the Deductive Rule, or Federal Rule, is that it is less prone to "double count" damages. The Deductive Rule works best in measuring overall loss in value as a result of takings in fee-simple interests by condemnation; and in measuring proximity damages under tort law.

Adductive Rule (State Rule). The Adductive Rule, State Rule, or Take Plus Damages Rule, is also sometimes misnamed the "before and after rule." The Adductive Rule separately measures the loss in value of the property taken before the taking and the damages to the remainder of a property before and after the taking. The Adductive Rule relies on "inductive logic."3 Under inductive logic damages are estimated by reasoning from the specific to the general. With the Adductive Rule the value of each item is added rather than deducted. This is in contrast with the Deductive Rule (Federal Rule) where damages are derived by a process of subtraction. The Deductive Rule processes aggregate market data and the Adductive Rule processes itemized data as shown below:

Adductive Rule Computational Format (State Rule)
Value of whole property before taking
$AAAA
Value of part taken as part of whole
$BBBB
Value of remainder before taking as part of whole (a-b)
$CCCC
Value of remainder after taking as part of whole
$DDDD
Indicated severance damages (c-d)

$EEEE
Minus Benefits
$FFFF
Net Damages (e-f)
$GGGG
Plus value of part taking (from "b" above)
$HHHH
Estimate of Just Compensation (b + h)
$IIII

The most frequently encountered weakness with the Adductive Rule is the tendency to "double count" damages, especially when estimating the loss in value, if any, from easements. This is easy to do because many appraisers do not understand that you cannot consider the difference in sales prices of properties with and without easements under the Adductive Rule. In appraisal terminology, using a "paired sales" analysis under the Adductive Rule is prone to resulting in the double counting of damages. This is because the difference in sales price between two otherwise identical properties, one encumbered with an easement and the other not, reflects overlapping values (e.g., value of take, severance damages, offsetting benefits, etc.).

One of the reasons the Adductive Rule came into existence is to provide compensation for easements where none is indicated from the market, or can be practically estimated from available market data. In so doing, public agencies and utilities avoid the appearance of not providing just compensation for property rights taken. The strength of the Adductive Rule is its usefulness in providing some compensation for partial acquisitions such as easements where the market would indicate a negligible loss or where it would be difficult to find relevant market data to measure the loss from a part taking for a public works project.

Reductive Rule (aka Incurable Obsolescence Rule). A more recent rule that has been promulgated for use in real estate damage cases is what will be called here the Reductive Rule.4 By definition, this rule is based on "reductive logic," which is a lessening or reducing computational process. Reduction is not the same as subtraction. Under the Reductive Rule, the "unimpaired value" of a property is reduced by costs-to-cure the damages rather than extracted from the market. The term reduction implies a process that is involuntary (e.g., "your benefits have been reduced"). The typical steps to the Reductive Rule are:

Reductive Rule or Tort Rule (Formula: I = U - C -S)
Unimpaired Value (Value Before)

$UUUU
Minus:

Mandated assessment costs
$AAAA

Mandated cleanup costs
$CCCC

Mandated ongoing monitoring costs
$MMMM

Stigma or market resistance
$SSSS

Total costs
$TTTT
$TTTT
Impaired Value (Value After)

$VVVV

The Reductive Rule is applicable in those cases where there is a relatively rapid decline in a property's value, not necessarily as a consequence of a physical taking for a public project, but due to such events as: a landslide, a regulatory downzoning, designation as a toxic waste site, historic designation, construction defect, wetland delineation, proximity to some unforeseen nuisance, undue delay of a public project resulting in pre-condemnation blight, physical invasion by flooding due to diversion of upstream storm runoff by a nearby property owner, ground failure caused by negligence of an adjoining property owner, exaction of mitigation fees by a municipality as a condition of development that are unconnected to actual development impacts, or some unforeseen event or condition over which a property owner can exercise little control. Usually in such situations the market demand for such a property vanishes or is reduced to deep discount buyers wanting to purchase it for a nominal or below equity price. The market typically reacts to such sudden drops in property value by trying to ascertain the magnitude of the loss, the likely time over which the loss will be sustained, any likely sources of recovery to mitigate or offset the loss, and the degree of uncertainty that accompanies a property with the risk of an unidentifiable market or uncertain and possibly uncontrollable costs to cure it of the condition which hinders its full market value. Markets dislike uncertainty and thus there is usually a market aversion to such properties until the risks, costs, and timing can be quantified in a more predictable way. This condition of uncertainty has been mislabeled with the disapproving term "stigma."

The Reductive Rule can be a plausible valuation model where it reflects adverse reductions in value resulting in incurable obsolescence or regulatory capture. However, the Reductive Rule has been improperly extended to define nearly all environmental conditions as damaging. Carrying the Reductive Rule to such an extreme has led to the criticism that it is prone to the logical fallacy of "Reductio ad Absurdum" (Latin for reduced to an absurdity) because if everything is damaging nothing is.

The Reductive Rule has been accepted on a limited basis in some property tax assessment appeal situations where a lowered assessment has been sought to account for clean up costs of a contaminated property; and has even been applied to lessen the just compensation award for eminent domain acquisition for contaminated school sites by deducting the clean up costs.5
In such situations where there is a "free fall" in property value, the loss sustained is often unrecoverable such as in regulatory actions, landslides that are often uninsurable, removal of a freeway ramp next to a gas station, termite damage, etc. These are what economists call "externalities" over which a property owner may have little control.6 In such calamitous situations the value of affected properties becomes highly uncertain, the marketing time is protracted, and liquidity is very limited. Properties with limited or no marketability due to negative externalities are often said to reflect a "shadow price"7 rather than a true market value. Appraisers who specialize in "damage valuations" of properties suffering from incurable obsolescence often cannot be proven wrong because the property's value is so uncertain. One conventional way to appraise properties suffering from such incurable obsolescence is to value the property free of the "reductant" (i.e., value reducing agent or condition). From this "unimpaired value," the costs to cure the depressing situation are typically either: (a) imposed on the property by regulatory entities often regardless of cost; (b) recovered from original principal responsible parties, insurers, government funds, or other third parties, with additional cost and delay; or (c) remain unquantified. A

real estate appraisal can provide no more certainty than the market. Thus, real estate appraisals of properties in such overwhelmingly distressed situations are more reliable when estimating the property's unimpaired value; and less reliable when estimating the "impaired value" because markets often do not determine the magnitude of the costs to cure or the length of time to remedy the situation.

However, a real estate appraisal can sometimes simulate the sale price of such highly distressed properties. An example would be "vulture investors" who purchased newer empty office buildings during the depth of the 1990's economic recession. However, properties for which there is not even the likely prospect of future demand, or are suffering from regulatory obstruction, in markets where even speculators are absent, often can only be hypothetically appraised. There is believed to be a tendency for such depressed properties to re-sell only during market peaks at approximately their former "reserved price," unadjusted for monetary inflation; although this postulate requires further empirical validation. Determining what the value of such properties is "between market cycles" may only be ascertainable from "distressed" or "depressed" sales data or hypothetical appraisals.

The much-ballyhooed notion of "stigma" that is frequently attributed to tainting the value of such properties even after they are "cured" also is another often misunderstood and over-worked concept in the real estate literature. After such properties are "cured" of their uncertainties the following axiom, borrowed from thermodynamic entropy theory, reflects the typical market reaction:

The Stigma Decay Axiom: The further the causal event is in the past, the smaller the uncertainty becomes; and will likely disappear entirely during market cycle peaks.8

The long-term value of stigma is that it doesn't have any lasting value. This is an inherent problem of valuing the effects of externalities because their effects are highly elastic and can disappear. Thus, to compensate property owners for stigma loss that may eventually dissipate may result in double compensation.

Is the Reductive Rule Compliant with Eminent Domain Law?

Does the Rule Disregard "Project Influence?" A cardinal rule in eminent domain appraisal is that an appraiser "shall disregard any increase or decrease in the fair market value of real property, prior to the date of valuation, caused by the project for which the property is to be acquired, or the likelihood that the property would be acquired for the project other than that due to physical deterioration within the reasonable control of the owner."9 Because the Reductive Rule would include such concepts as "project stigma" or temporary "project blight," that typically are to be disregarded in condemnation situations, the Reductive Rule is inconsistent with eminent domain law.

Does the Reductive Rule Exclude "Non-Market Value" Damage Concepts? United States Court of Appeals Law Clerk Donald J. Kochan, J.D., has stated: "Because subjective value is impossible to validate when determining damages, compensation awards are forced to use the more objective 'market value' standard."10 The courts typically have made a flexible interpretation of what constitutes market value compensation especially with special purpose properties, but most often exclude certain other kinds of damage concepts, or alleged damages. Lewis Orgel in Valuation under the Law of Eminent Domain relates that damage concepts that are speculative, remote, trivial, imaginary, psychological, or ambiguous are typically not admissible in eminent domain.11 Particularly excluded are "double damages,' or those damages which occur, sometimes inadvertently, from "overlapping" the "artificial dichotomy" of "value of the area taken" and "damages to the remainder" or "damages due to the taking" and those "not due to the taking"12 Of course, there is sometimes an irrational element at work in real estate markets, but such irrational factors can only be assumed to be already embedded into market

prices.

The Reductive Rule's emphasis on such concepts as "stigma," "market resistance," "perceptual damages," and oxymoronic (i.e., self-contradictory) terms like "imposed damages" (when are damages not imposed?), leads one to conclude that such unacceptable concepts would be erroneously included in an eminent domain damage valuation. This does not mean that condemning agencies should pay the unimpaired value for property subject to a landslide, or the enhanced value for property benefited by a new freeway offramp, but that they should pay the price unaffected by increases or decreases in value attributable to the public project.

Does the Reductive Rule Separate Severance and Proximity Damages? Eminent domain law makes it clear that severance damages are to be separated from "proximity damages" or "consequential damages."13 The Reductive Rule makes no distinction between types of damages in partial acquisitions for public works projects and thus is not consistent with eminent domain law. Moreover, the Reductive Rule's emphasis on such terms as "stigma" damages and "market resistance" lead one to the conclusion that such factors would be included in eminent domain damage estimate rather than a separate proximity damage action.

Does the Reductive Rule Exclude Damages that Must Be Brought by Other Actions? For the most part, actions that result in the decline of the market value of property caused by the expectation of negligent acts by a condemnor after a taking may not be considered in determining recoverable damages inside an eminent domain action.14 In such cases a property owner may have recourse by way of bringing a tort, inverse condemnation, or nuisance action. In general, future negligence may not be anticipated in a claim for damages in eminent domain law. The courts have found it necessary to control valuation testimony where the witnesses "prophesies" have become "visionary or fantastic."15 Where the courts have allowed consideration of the extra risk resulting from a public project, the courts have generally specified that the amount of risk should be estimated as if the public project or facility will not be operated negligently.16 This "non-anticipation doctrine" would appear to run counter to the Reductive Rule because of its reliance on such subjective concepts as "perceptual damages," "market resistance," and "stigma."

Is the Reductive Rule More Suited for Tort and Regulatory Takings?

Government agencies and public utility companies also face the possibility of having to defend against property damage claims for inverse condemnation actions, tort17 actions, regulatory takings, and nuisance claims. Corporations and real estate investment trusts face the specter of tort and nuisance actions.

Inverse condemnation is a civil suit brought against a public or quasi-public entity with the power of eminent domain by a property owner alleging inadvertent appropriation of part or all of their property rights without condemnation and compensation.18 Types of inverse condemnation damages may include interference with land stability, injury by escaping sewage, loss of or interference with access, raising or lowering the street grade, interference with purchase option contract, and land regulation enacted in bad faith.

Tort actions19 are those where there is either intentional harm or negligence. In tort actions, liability is generally not imposed unless it is established there was "proximate cause" between the injury and the actions of a defendant. To prove "proximate cause" plaintiffs must typically meet the "non-foreseeability" and "harm-within-the-risk-tests" (see below). Types of tort actions may include diminution to property values surrounding an airport from a newly added runway, toxic cleanup costs,

and proximity to power lines.

Regulatory takings occur when property rights have been appropriated by government regulations or zoning laws where there is no rational and proportionate nexus between the regulation and the government's requirements to dedicate land, exact mitigation fees, etc.20 Examples of regulatory takings might be lengthy and undue delay or denial in processing development permits; overreaching requirements to dedicate land for bike trails; or exaction of fees unconnected with mitigation of the impacts created by development.

On its face, the Reductive Rule is more suitable for recovery of damages under tort law or regulatory takings law than condemnation law. However, the mistaken publicizing of the Reductive Rule as an umbrella real estate damage valuation model for use in condemnation, tort, regulatory takings, and other property damage situations has confused the entire issue of the proper methodological approach to use in each situation, resulting in methodological chaos in the real estate industry.

Does the Reductive Rule Comply with the "Proximate Cause Tests" of tort law? The legal doctrine called "proximate cause" operates as a limitation on liability in tort cases involving alleged property damages. There are two basic tests of "proximate cause" called the "non-foreseeability test" and the "harm-within-the-risk test."21 The "non-foreseeability test" could also be called the "market value test" because it comports with the "knowledgeability criteria" contained in the legal definition of market value (i.e., knowledgeable buyer test). This test states that there is no proximate cause between the harm done to the value of a property if the harm was "foreseeable" or avoidable. This is the converse of eminent domain law where condemnation is assumed to be imposed and unforeseen. The critical factor in the foreseeability test is timing and what is called the "coming to the harm problem." For example, if a property owner came to live next to a pre-existing airport, there is assumed to be foreknowledge of its proximity and thus no compensable damages. Conversely, if the airport expands its runways causing a permanent diminution in surrounding property values that was unforeseen, damages may be sustainable under a tort action. Because the professional literature promulgating the Reductive Damage Rule has thus far failed to consider the market value "foreseeability test," this has resulted in the justifiable criticism that the Reductive Rule is prone to double damage compensation.

The second test of proximate cause is called the "harm-within-the-risk-test." This means that there must be a rational relationship between the harm caused and the actions or negligence of another party. For example, suppose that a property owner brings a tort action against a government water agency because underground water seepage has undermined the foundation on his home causing wall cracks and damage. But if the water agency named in the complaint has no reservoir or pipelines near the damaged property, the harm was not caused by the water company's facilities because they were not "proximate." Thus, the resulting harm was not within the risk posed by proximity to the water company's facilities.

Some of the proponents of the Reductive Rule who have catalogued hundreds of purported damaging conditions affecting property values fail to recognize the legal doctrine of "proximate cause." Mere categorization or indexing of hundreds of potentially harmful conditions does not meet the causation tests incorporated into tort law and is legally meaningless and misleading. Damage valuation theories currently in vogue in the real estate industry have replaced probable cause and real risk with an endless list of improbable harms from phantom risks.22 Such theories have circularly defined nearly every environmental condition affecting real estate as "detrimental." Moreover, such damage valuation theories assume as given that such detrimental conditions cast a "stigma"23 on surrounding property values due to the occurrence of some past damaging event irrationally associated with them. But the law gives little to no credence to the highly advertised concept of "stigma," but does recognize such concepts as "negligence," "intentional harm," and "proximate cause."

Does the Reductive Rule Comply with the "Lesser-Of Rule" of tort, insurance, and eminent domain law? Eminent domain, insurance, and tort law conventionally contains a provision called the "Lesser-Of Rule" whereby the amount of property damages to which a property owner is entitled is to be measured by "market diminution, or cost-to-cure, whichever is the lesser of the two."24 The Lesser-Of Rule comports with the Principle of Substitution in real estate appraisal, which states that: "when several similar or commensurate commodities, goods, or services are available, the one with the lowest price attracts the greatest demand and widest distribution."25 Current real estate damage valuation theories relying on the Reductive Rule make no such distinction and thus are manifestly inconsistent with prevailing damage law and economic principles.

Does the Reductive Rule conform to newer scientific standards for damage cases? Recent case law at the Federal level and twenty seven state jurisdictions have mandated that damage actions must comply with the tests of the scientific method, called "Daubert Tests" after the case that established this rule (Daubert vs. Merrill Dow Chemical, 1993). The Reductive Rule is inconsistent with the scientific method because it often merely assumes causation and relies on what scientist Stephen S. Carey calls "extraordinary claims," "anecdotal evidence," and an inherent inability to empirically test the claims of damage.26 Under reductive logic a damage claim cannot be disproven or "falsified" as would be required under the scientific method. According to Karl Popper in his definitive book entitled The Logic of Scientific Discovery, to be scientific a method must follow deductive logic, not inductive or reductive logic.27 Thus, the promulgation of damage valuation models based on reductive logic and reductionism is inappropriate because such methodologies would not meet the requirements of damage law in those jurisdictions where scientific tests are required.

Using Contrived Rules to Intimidate Settlements

A disturbing trend in the real estate industry is the use of contrived or improvised rules as an "intimidation factor" to batter corporate, public utility, and government entities into pre-trial settlements for much higher damage compensation than would otherwise be produced by conforming to accepted damage rules. Often these tactics violate the "Lesser-Of Rule" mentioned above by using only the higher value of "market diminution" or "cost-to-cure." The justification for use of such concocted rules is that the accepted rules only apply in courtroom settings for damage actions, not in pre-trial legal settlements. Apparently, playing by the rules only applies to appraisers and attorneys employed by corporate, utility, and government entities defending against damage actions. Outside of courtrooms plaintiffs in damage actions have more discretion to use any valuation method of their choosing as an intimidation strategy. The courts may even be misled to admit expert valuation testimony based on erroneous damage appraisal methods because it often focuses on pre-qualification of the credentials of the appraisal experts rather than the methods of valuation.

The ethical implications of the misuse of such rules is obvious, but ironically does not appear to be considered a violation of the professional ethical rules of the real estate industry. In the best interest of the public, it would behoove professional real estate organizations and the legal system to plug this ethical loophole.

Conclusion

Mathematician J.R. Newman stated that "Logic is neither science or art, but a dodge."28 However, it is not believed that property damage valuation models currently in fashion in the real estate industry are fraudulent or evasive, but that they are sloppy, illogical, oversold, and mistakenly often rely on dubious science.29

The three rules discussed in this paper are for the most part not interchangeable and the synthetic mixing of these rules is at minimum illogical and at maximum misleading. The following general logical rules are offered for consideration as to the proper method to use for different legally defined damage valuation situations:

"Eminent Domain Computational Damage Rule: Deduce, adduce, but don't reduce, unless compelled by law otherwise."

Tort Damage Computational Rule: Deduce or reduce, but only where there is "proximate cause;" but avoid reducing where damage estimates must meet the requirements of the scientific method."

Regulatory Taking Computational Rule: "Reduce; unless compelled by law to meet the scientific method, then deduce."

Damage Compensation Rule Chart

Deductive Rule
(Aka Federal Rule)
Adductive Rule
(Aka State Rule)
Reductive Rule
(Tort Rule)
Logic system
Deduction
Induction
Reduction
Method
Before and After
Take Plus Damages
Value/Time=Damage
Similar Value Method
Sales Comparison
Cost Approach
Income Approach
Damage estimation procedure
Paired sales comparison
Subjective percentage analysis by expert
Costs to cure; or non-economic subsidies
Focus on:
Overall loss from fee part takes
Easements and curable costs
Damages from externalities & incurable obsolescence
Type of data analyzed
Aggregate data
Itemized data
Diminution or
Imposed costs
Formula
B - A = C
Before Value
Minus After Value

= Compensation
T + (D-B) = C
Value of Take
Remainder Value Before
Remainder Value After
Gross Damages
Minus Benefits
Net Damages
= Take + Net Damages
I = U - C - S
Unimpaired Value
Minus Assessment Cost
Minus Repair Cost
Minus Ongoing Costs
Minus Stigma
= Impaired Value

Legal Precedent in
Eminent Domain Law
Yes
Yes
Limited (contaminated sites for public schools only)
Considers damage offsets (benefits)
Yes
Yes
Limited to insurance recoveries, indemnifications
Project Influence
Inadmissable
Inadmissable
Admissable
Prone to Double Compensation
No
Yes
Yes
Excludes proximity damages to property not physically taken
Yes
Yes
No
Excludes speculative, remote, trivial damages
Yes
Yes
No
Separates damages for which owner could later recover under a tort action
Yes
Yes
No
Lesser-Of Rule
Lesser of diminution or cost to cure
Lesser of diminution or cost to cure
Lesser of diminution or cost to cure
Foreseeability Principle

Yes
No/Yes
Yes
Harm-Within-Risk Test
Yes
Yes/No
Yes
Complies with scientific method
Yes
No
No
Research design
Whole before & after
Take before; remainder before & after
Value before; costs after + stigma
Value indicated
Market value loss
Loss + public policy
Shadow prices

1 J.D. Eaton, Real Estate Valuation in Litigation (Appraisal Institute, 1989): 10-26.
2 Deductive logic - employing deduction (an act of taking away) in reasoning, Webster's Ninth New Collegiate Dictionary (Merriam-Webster, 1984): 332.
3 Induction - the act or process of inducting, bringing forward, adducing. Webster's Ninth Collegiate Dictionary (1984): 615.
4 Reductive - oversimplifying complex things and ignoring the subtleties or important details. Reductionism - misguided belief that everything can be explained in simple terms. Encarta World English Dictionary (St. Martins Press, 1999): 1505.
5 California Code of Civil Procedure Section 1263.720 (a), (b); and Section 1263.740.
6 Externality - the likelihood that one land use may make neighboring uses more or less desirable. Donald Hagman and Dean Misczynski, Windfalls for Wipeouts: Land Value Capture and Compensation (Planners Press, 1978): xxxi.
7 Shadow price -the estimated price of goods or a service for which no market price exists. Encarta World Dictionary (1999): 1644.
8 Attributed to Charles B. Warren, ASA (Urban-Real Property), San Francisco, California.
9 Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 (Public Law 91-646) Section 42.11(c) (1).
10 Donald J. Kochan, "'Public Use' and the Independent Judiciary: Condemnation in an Interest Group Perspective," Texas Review of Law and Politics, Vol. 3, No. 1, Fall 1998: 107.
11 Lewis Orgel, Valuation under the Law of Eminent Domain, 2nd ed. (Michie Co., 1953): 266-268.
12 Orgel (1953): 51; 253-266.
13 Orgel (1953): 254.
14 Orgel (1953): 287.
15 Orgel (1953): 293-294.
16 Orgel (1953): 286.
17 Tort - The word "tort" means harm.
18 M. Reed Hunter and Davidson Ream, Condemnation Practice in California (CCEB,1973): 332.
19 Tort - a civil wrong not arising out of a contract. Kenneth S. Abraham, The Forms and Functions of Tort Law (The Foundation Press, 1997): 1.
20 William A. Fischel, Regulatory Takings: Law, Economics, and Politics (Harvard Univ. Press, 1995).

21 Kenneth S. Abraham, The Forms and Functions of Tort Law (Foundation Press, 1997): 118-121.
22 Kenneth R. Foster, et al. Phantom Risk: Scientific Inference and the Law (MIT Press, 1993).
23 Stigma is defined as a rational fear; phobia is an irrational or illogical fear. Webster's Ninth New Collegiate Dictionary (1984).
24 M Reed Hunter (1973): 106.
25 Appraisal of Real Estate, 10th Ed. (AI, 1992): 39.
26 Stephen S. Carey, A Beginner's Guide to the Scientific Method, 2nd. Ed., (Wadsworth, 1998).
27 Karl S. Popper, The Logic of Scientific Discovery (Routledge: 1992): 27-48.
28 J. R. Newman, Ed., The World of Mathematics (Simon and Schuster, 1956).
29 Cassandra Chrones Moore, Haunted Housing: How Toxic Scare Stories are Spooking the Public (Cato, 1997).

2

Home