
THREE RULES FOR FORENSIC REAL ESTATE DAMAGE VALUATION: DEDUCTIVE, ADDUCTIVE, OR REDUCTIVE RULE?

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FORENSIC VALUATION: WHAT IS IT?

Forensic real estate valuation is the application of economic principles and methodologies to answer questions of fact as to whether real estate values have suffered a permanent damage. Forensic real estate valuation contrasts with the prevailing valuation theory in the real estate industry that often fails to distinguish permanent loss from the following:

SITUATIONS WHERE DAMAGES ARE IMPERMANENT OR NON-RECOVERABLE

- Where the market has already provided "implicit compensation" for a pre-existing "foreseeable" condition (*i.e.*, the "foreseeability damage test").
- Where the purported loss reflects the real estate market cycle.
- Where the loss was insured and thus recoverable.
- Where the loss is a brief, temporary loss of marketability.
- Where the loss was mitigatable or avoidable.
- Where the loss is speculative or stems from a self-interested claim of "stigma."
- Where any diminution in value reflects a changed highest use of the property rather than full economic loss.
- Where the loss is due to non-compensable regulatory changes.

- Where there is an interim use, or “next-best use,” of a property that serves as a prophylaxis against total loss.
- Where “project influence” from a public project results in an increase or decrease in property value that is legally not to be considered in an eminent domain property appraisal. “Project stigma” is a self-contradictory term because it is legally disallowed in public agency real estate appraisals.
- Where any diminution in property value was possibly due to some extraneous condition or event other than that purported.
- Where there was no discernible damage at all.

Alleged damages might be the result of a physical invasion; proximity to a nuisance; overreaching land use regulations; indirect benefit or burden transfers; some fickle and transitory notion of stigma; or irrational phobic reaction to some uncertain environmental substance or condition. From this starting point the forensic valuation consultant gathers evidence to determine if permanent damages have occurred. Like forensic engineering, forensic real estate valuation is similar to failure analysis and root cause analysis with respect to the methodologies and logic employed.¹

The term “forensic” is used here to connote the investigation of whether property values have been permanently damaged in the context of a trial of fact, pre-trial settlement, arbitration, or as a matter of public policy. Forensic valuation is like conventional real estate appraisal in that appraisers are held to a standard to not fudge the numbers, to avoid unacceptable valuation methods, and to shun undisclosed assumptions to back up a desired result. But the distinguishing characteristic of forensic valuation is its focus on the measurement of permanent property losses, its insistence on the use of consistent, logical, and legally appropriate valuation methods to the situation at hand, and its adherence to the scientific method that requires the reporting of unwanted results and disconfirming market data.

RE-DEFINING THE THREE CONVENTIONAL APPROACHES FOR DAMAGE VALUATION

Neither law nor real estate appraisal has thoroughly clarified the different damage valuation methodologies that are applicable under tort law, condemnation law, regulatory takings law, and inverse condemnation law in various political jurisdictions. Real estate appraisal generally relies on three cardinal valuation methods: the Cost, Sales Comparison,

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and Income Approaches. This article shows that there are three methods of damage valuation that generally comport with the three conventional methods of valuation.

The three conventional valuation methodologies have been incorporated into damage law under different terminology and computation formats. Two rules predominate and have mostly been applied to damage situations involving use of eminent domain powers by public entities:

Existing Nomenclature for Damage Valuation Rules:

- The Federal Rule or Before and After Rule (Comparison Approach)
- The State Rule or Value of the Take Plus Damages Rule (Cost Approach)

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 26 state jurisdictions and is also the accepted measure of damages under tort law.

The State Rule, adopted in 24 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. However, it has been promoted as the universal paradigm for real estate damage valuation in the bulk of the professional literature.

For the purpose of this manuscript the following terms shall be used:

Redefined Rules for Damage Valuation:

- “**Deductive Rule**” (aka Federal Rule) or sales comparison approach
- “**Adductive Rule**” (aka State Rule) or cost approach
- “**Reductive Rule**” (aka Stigma Rule) or income approach in the sense of reduction to net.

These three logic rules are analogous to the Sales Comparison Approach (deductive method), Cost Approach (adductive method), and the Income Approach (reductive method, in the sense of reducing to net) 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.² 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.”³ 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 shown in *Table 1*:

Table 1

Deductive Rule Formula or Federal Rule	
(Formula: $V_b - V_a = JC$)	
Value Before	\$1,000,000
Minus Value After	\$750,000
Equals Just Compensation	= \$250,000

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.

Strengths and Weaknesses -- 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 where damages are alleged to have resulted from the acquisition of minor easements where the real estate market does not recognize any diminution for such encumbrances; or where it is impractical to measure such diminution from limited or unavailable 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.”⁴ The Adductive Rule separately measures the before and after value of the property to determine whether a physical taking for a public works project results in any damages. The Adductive Rule relies on “inductive logic.”⁵ 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 to the Deductive Rule (Federal Rule) where

Table 2

Adductive Rule Computational Format (State Rule)	
a. Value of whole property before taking	\$1,000,000
b. Value of part taken as part of whole	\$200,000
c. Value of remainder before taking as part of whole (a-b)	\$800,000
d. Value of remainder after taking as part of whole	<u>\$700,000</u>
e. Indicated severance damages (c-d)	\$100,000
f. Minus Benefits	\$50,000
g. Net Damages (e-f)	\$50,000
h. Plus value of part taking (from "b" above)	<u>\$200,000</u>
i. Estimate of Just Compensation (b + h)	\$250,000

damages are derived by a process of subtraction. The Deductive Rule processes aggregate market data and the Adductive Rule processes itemized data as shown in *Table 2*.

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 the imposition of easements on a property. 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 computational format for the Adductive Rule results in overlapping values (*e.g.*, value of take, severance damages, offsetting benefits, etc.).

Strengths and Weaknesses -- One of the reasons the Adductive Rule came into existence is to provide compensation for public takings 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 Stigma 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.⁶ 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 and does not originate in the real estate market (*e.g.*, "your benefits have been reduced"). The Reductive Rule is a hybrid of the Comparison and Cost Approaches to valuation. The typical steps to the Reductive Rule are shown in *Table 3*.

The Reductive Rule is seemingly more applicable in those cases where there is a relatively rapid and often incurable 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:

Where the Reductive Rule Is Usually Applied:

- a landslide
- a regulatory downzoning

Table 3

Reductive Rule or Stigma Model (Formula: $I = U - C - S$)		
Unimpaired Value (Value Before)		\$1,000,000
Minus:		
Mandated assessment costs	\$25,000	
Mandated cleanup costs	\$100,000	
Mandated ongoing monitoring costs	\$25,000	
Stigma or market resistance	\$100,000	
Total costs	\$250,000	<u>\$250,000</u>
Impaired Value (Value After)		\$750,000

- designation as a toxic waste site
- historic designation
- identification as asbestos hazard building
- 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 critical amount of portion of land or mitigation fees by a municipality as a condition of development that is 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 for 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 determine:

Market Reaction to Economically Incurable Obsolescence

- ascertain the magnitude of the loss
- the amount of time over which the loss will likely be sustained
- any likely sources of recovery to mitigate or offset the loss
- 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.”

Strengths and Weaknesses -- The Reductive Rule can be a plausible valuation model where it reflects adverse reductions in value resulting in full incurable obsolescence or regulatory capture. However, the Reductive Rule valuation format does not address the critical issue of a changed highest and best use for a property after suffering full economic obsolescence of its former highest use. For example, toxic waste sites can become “brownfields,” waste recycling facilities, or used for open storage without triggering the legal requirements to clean up the site. Such uses are often economically productive, albeit often not equivalent to the same level of their former productive use.

Many of those who tout the Reductive Rule mistakenly claim it is a universal framework for property damage valuation. The Reductive Rule has been used to categorize hundreds of 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 or proof by contradiction) because if everything is damaging nothing is.⁷ Damage valuations

that place mistaken reliance on the Reductive Rule are susceptible to the criticism that they are logical fallacies.⁸

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 cleanup costs of a contaminated property.⁹ It has also been applied to lessen the just compensation award for eminent domain acquisition for contaminated school sites by deducting the cleanup costs.¹⁰

In situations where there is a "free fall" in property value; the loss sustained is often unrecoverable 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.¹¹ 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"¹² rather than a true market value. Appraisers who claim to specialize in "damage valuations" of properties where the whole property suffers from incurable obsolescence often cannot be proven wrong because the property's value is so uncertain.

One way proposed 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 usually follows one of these scenarios:

Cost-to-Cure Scenarios:

- Curative measures are imposed on the property by regulatory entities often regardless of cost. These costs often are applied against the business component or "going concern" and typically do not apply against the real estate unless the business is insolvent or the principal responsible party is defunct.
- Remediation costs are recovered from original principal responsible parties, insurers, government funds, or other third parties, or are self-mitigated, with additional cost and delay.
- Costs-to-cure remain unquantified.

A real estate appraisal can provide no more certainty than the market. Thus, real estate appraisals of properties in such overwhelmingly distressed

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situations are more reliable when estimating the property's unimpaired value; and less reliable when estimating the "impaired value." This is because markets often do not determine the magnitude of the costs to cure or the length of time to remedy the situation. And because properties suffering such economically incurable obsolescence sometimes cannot be exposed to the market to find their true market value, and many only reflect a "shadow price," speculative appraisals often abound.

The much-ballyhooed notion of "stigma" that is frequently attributed to tainting the value of such properties (even after they are "cured") is also another often misunderstood and over-worked concept in real estate literature. After such properties are "cured" of their physical defects or other impediments 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.*¹³

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 such effects are highly elastic and can disappear suddenly. Thus, to compensate property owners for stigma loss that may eventually dissipate, or would otherwise be recoverable through insurance or avoidance, may result in double compensation.

CONCLUSION

Three legal logic systems have been examined in this manuscript for measurement of real estate damages for forensic real estate valuation: the deductive rule, adductive rule, and the reductive rule. Mathematician J.R. Newman stated that, "Logic is neither science or art, but a dodge."¹⁴ However, it is not believed that property damage valuation models currently in fashion in the real estate industry are

Table 4

Forensic Real Estate Damage Valuation Rule Chart

	Deductive Rule (Aka Federal Rule)	Adductive Rule (Aka State Rule)	Reductive Rule (Stigma 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 transfers
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 <u>Net Damages</u> = Take + Net Damages	$I = U - C - S$ Unimpaired Value Minus Assessment Cost Minus Repair Cost Minus Ongoing Costs <u>Minus Stigma</u> = 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	Inadmissible	Inadmissible	Admissible
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
Separates stigma from phobia	Yes	Yes	No
Lesser-Of Rule	Lesser of diminution or cost to cure	Lesser of diminution or cost to cure	Cost-to-cure plus stigma
Foreseeability Principle	Yes	No/Yes	Yes
Harm-Within-Risk Test	Yes	Yes/No	Yes
Complies with scientific method	Yes	No	No
Pre-Post research design	Whole before & after	Take before; remainder before & after	Value before; costs after + stigma after
Value indicated	Market value loss	Loss + public policy compensation	Shadow prices
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necessarily fraudulent or evasive, but that they are sloppy, illogical, oversold, and undisclosed.

The three rules discussed in this article are for the most part not interchangeable and the synthetic mixing of these rules is at minimum illogical and at maximum misleading. *It is believed that the promulgation of the Reductive Rule by the real estate industry as an apparent universal framework for all types of real estate damages is badly chosen and is resulting in methodological chaos in the real estate industry.* Inconsistent use of these three damage rules may lead to inaccurate damage valuation conclusions, unnecessary disparities between damage appraisals, "double damage" awards, and lowered public confidence in appraisers.¹⁵ The following general logical rules are offered for review and consideration as to the proper method to use for different legally defined damage valuation situations:

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

State Rule: Adduce, but don't reduce, unless compelled by law otherwise.

Tort Damage Computational Rule: Deduce but only where there first is proven "proximate cause." Avoid reducing where damage estimates must meet the requirements of the scientific method (i.e., "Daubert tests").

Regulatory Taking Computational Rule: "Deduce or reduce; unless compelled by law to meet the scientific method (i.e., "Daubert tests"), then deduce."

Consultants serving corporate clients, real estate investment trusts, and government entities, or legal counsel for alleged damaged property owners, need to be cognizant of the differences in the three damage valuation rules when pursuing or defending real estate damage claims.^{REI}

NOTE:

The views and opinions expressed in this article are exclusively those of the authors.

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ABOUT THE AUTHORS

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precondemnation blight from dam construction projects, and related proximity damage studies as well as individual appraisals of properties for damages resulting from landslide, floods, visual blight, subsidence, and ground contamination. [REDACTED]

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