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Regulatory Takings

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by

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Abstract: A regulatory taking occurs when a government regulation reduces the value of private property to such a degree that the owner is entitled to compensation under the Fifth Amendment Takings Clause. This chapter reviews legal and economic theories aimed at determining when a regulation crosses the compensation threshold. It also assesses the consequences of various compensation rules on the efficiency of land use decisions and government policymaking.

Key words: Compensation, eminent domain, regulation, takings
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Regulatory Takings

1. Introduction

The regulatory takings issue potentially arises whenever a government regulation restricts the use of private property without actually seizing title to it. Examples include zoning, environmental and safety regulations, historic landmark designation, rules requiring equal accommodation for the disabled, and so on.[1] From an economic perspective, regulations that reduce the value of private property are not fundamentally different from outright takings (i.e., seizures of property); the difference is one of degree rather than of kind. Thus, any deprivation or restriction of a particular right reduces the value of the property proportionately. A physical taking, which deprives the owner of all rights, is simply one end of a continuum.

Given this analytical equivalence between seizures and regulations, a separate treatment of the two types of actions does not appear to be warranted by economic theory. Yet the fact remains that courts have treated them quite differently: whereas compensation is virtually always required for seizures, it is rarely awarded for regulations. Indeed, courts have historically granted the government broad police powers to enact regulations in the public interest without the need to compensate property owners for lost value. Still, in some few cases, courts have ruled that if a regulation goes "too far" in restricting private property, it will be ruled a "regulatory taking" and compensation will be due. The question, therefore, is where the dividing line is (or should be) between compensable and non-compensable regulations.

There exists a considerable body of case law and legal scholarship aimed at answering this "compensation question." A review of the various tests that have emerged from this investigation illustrates the range of perspectives that have been brought to bear on this debate,

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[1] See Miceli and Segerson (1996) Meltz, et al. (1999), and Miceli (2011, Chapter 5) for detailed examinations of several of these regulations within the context of takings law.

and also reflects the apparent lack of consensus on an adequate answer. The goal of this chapter is to survey the contribution economic theory has made to this debate, highlighting the most significant insights and results. We do this using a simple model of takings or land use regulation that provides a unifying framework for discussing the economics of regulatory takings. We use the model to illustrate both basic economic principles related to compensation and a number of extensions that have been considered in the literature. As a prelude, we provide brief reviews of the case law and legal literature in this area.

2. Overview of the Case Law

2.1. The physical invasion test

Nearly all courts have agreed that any government action that involves some sort of physical invasion of a landowner's property, even when it does not literally seize title, constitutes a compensable taking. For example, in *Loretto v. Teleprompter*,[2] the Court held that a state law allowing cable television providers to install wires and other equipment on a private building was a taking. Although the *physical invasion test* is well-established in takings law, it is of limited usefulness because it offers no guidance for the vast majority of government actions, like zoning and environmental regulations, that involve no invasion. The remaining legal tests concern these sorts of cases.

2.2. The noxious use doctrine

An important early test was established in the case of *Mugler v. Kansas*,[3] which concerned a law passed by the state of Kansas, pursuant to a prohibition amendment to the Kansas constitution, forbidding the operation of breweries. The owner of a brewery sued for compensation on the grounds that the law constituted a taking of his property, but the U.S.

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[2] 458 U.S. 419 (1982).
[3] 123 U.S. 623 (1887).

Supreme Court denied the claim based on the state's right to regulate, without compensation, those activities that are deemed "to be injurious to the health, morals, or safety of the community;"[4] so-called "noxious uses." This ruling, referred to as the *noxious use doctrine*, recognized that the government has broad regulatory powers to prevent land uses seen as potentially harmful to the public.

Zoning ordinances provide the most common illustration of this principle, and courts have routinely upheld them as valid exercises of the government's right to regulate land use in the public interest. The first case to reach such a conclusion was *Village of Euclid v. Ambler Realty*,[5] which upheld a city ordinance zoning a portion of the plaintiff's land for residential use. The Court maintained that the ordinance fell within the city's inherent right, under the police power, to protect public health, safety, morals, and general welfare (Meltz, et al., 1999, p. 214).

2.3. The diminution of value test

Under the noxious use doctrine, the impact of a regulation on the landowner's value apparently had no bearing on the compensation question. However, that view changed in 1922 when the Supreme Court decided the famous case of *Pennsylvania Coal v. Mahon*.[6] The case concerned a law passed by the State of Pennsylvania aimed at protecting the safety of surface owners against the risk of cave-ins (or subsidence) by requiring that coal companies leave enough coal in the ground to support the surface. The Pennsylvania Coal Company brought suit seeking compensation on the grounds that the regulation was a taking of its legal right to mine all of the coal under the surface. (Under a common legal arrangement, the mining company had sold the surface rights but had retained the mineral rights to the subsurface coal.) Although the

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[4] *Id.*, p. 668.
[5] 272 U.S. 365 (1926)
[6] 260 U.S. 393 (1922). Also see Friedman (1986), who characterized the *Penn Coal* decision as a "watershed" in takings law.

case seemed to be an easy one under the noxious use doctrine, given that the law clearly met the standard of protecting the safety of the surface owners, the Court ruled that compensation was due.

Writing for the majority, Justice Oliver Wendell Holmes argued that, in spite of the noxious use doctrine, there must be a limit to the government's power to regulate private property. That limit, he said, is embodied in the impact of the regulation on the landowner:

> One fact for consideration in determining such limits is the extent of the diminution [in the landowner's value]. When it reaches a certain magnitude, in most if not all cases there must be an exercise of eminent domain and compensation to sustain the act.[7]

This argument forms the basis for the *diminution of value test* for compensation, which says that compensation is due if the loss to the landowner as a result of a regulation is sufficiently large. Of course, this raises the question of what amount of loss is large enough to meet the compensation threshold; Holmes only said that "if regulation goes too far it will be recognized as a taking."[8] He therefore left it to future courts to decide on a case-by-case basis what constitutes "too far."

Over six decades later, the Supreme Court confronted a case with an almost identical factual scenario as in *Pennsylvania Coal*. The issue again was whether an anti-subsidence statute passed by the state legislature was a taking of the coal company's rights, but in apparent contradiction of its earlier ruling, the Court in *Keystone Bituminous Coal Assn. v. DeBenedictus* (1987) ruled that it was not. In endeavoring to distinguish the two cases, the Court argued that the statute at issue in *Keystone* protected a broader public interest, whereas the earlier statute had been aimed at protecting only a few private parties. Although the distinction between public and private in this context is not strictly valid from an economic perspective, we will argue below

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[7]*Id.*, p. 413.
[8] *Id.*, p. 415.

that changing values of both the surface and mining rights over the intervening time period can provide a legitimate basis for distinguishing the two cases.

2.4. The Penn Central balancing test

The need to balance the factors raised in these earlier cases—namely, the intent of the regulation and its impact on the landowner's property value—was made explicit in the case of *Penn Central Transportation Co. v. City of New York*.[9] This case arose out of the city's decision to designate Grand Central Terminal as an historic landmark, thereby limiting the sort of alterations that the owners could make.[10] Thus, when the Landmark Preservation Commission turned down a proposal by Penn Central to build a multi-story office building above the terminal, the owners sued, claiming a taking of their right to develop. In deciding against compensation, the Supreme Court advanced a three-part test for determining whether or not a compensable taking has occurred. The relevant factors were (1) the character of the government action, (2) whether or not the regulation interfered with "investment-backed expectations," and (3) the extent of the diminution of value. The first and third of these factors clearly identified the importance of both the noxious use doctrine and the diminution of value test, though once again without offering explicit guidance on how to balance one against the other.

The second factor, emphasizing the importance of investment-backed expectations, captures the idea that any loss suffered by the landowner must have been based on reasonable expectations, backed up by actual investments (Fischel, 1995, p. 50; Mandelker, 1987). In other words, an owner could not claim to have been denied uses that he never would have contemplated, or that would not have been allowed by law, in the absence of the regulation.

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[9] 438 U.S. 104 (1978).
[10] On landmark designation and takings law, see Gold (1976).

Thus, as a necessary condition for compensation, a claimant would have to show evidence that he had in fact planned to undertake the prohibited development.

In his dissenting opinion to the *Penn Central* ruling, Judge William Rehnquist added a further consideration when he stated that "a taking does not take place if the prohibition applies across a broad cross section of land and thereby 'secure[s] an average reciprocity of advantage.'"[11] The phrase "average reciprocity of advantage," first used by Holmes in his *Pennsylvania Coal* opinion, suggests that monetary compensation need not be paid if a regulation restricts all landowners equally, thereby spreading both the benefits and the costs of the regulation. The Supreme Court employed similar logic in the case of *Agins v. Tiburon* when it held that a landowner subject to a zoning restriction "will share with other owners the benefits and burdens of the city's exercise of its police power. In assessing the fairness of zoning ordinances, these benefits must be considered along with any diminution in market value that the appellants might suffer."[12] We will return to this logic in Section 5 below.

2.5. The nuisance exception

An important extension of takings law emerged from the case of *Lucas v. South Carolina Coastal Council* (1992).[13] The case involved a land developer who had purchased two beachfront lots in South Carolina with the intention of developing them for residential use. Such a use seemed reasonable at the time of purchase since several similarly situated neighboring lots had already been developed. However, after the developer's purchase but before he began development, the South Carolina legislature passed a law prohibiting further beachfront development in the area in an effort to control coastal erosion. Since the regulation rendered the lots essentially valueless, the developer sued, claiming a taking. A trial court found in his favor

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[11] *Id.*, p. 147.
[12] 157 Cal.Rptr. 373, 1979; affirmed 447 U.S. 255, 262 (1980).
[13] 505 U.S. 1003 (1992).

and awarded full compensation. However, the South Carolina Supreme Court reversed the ruling, despite the nearly complete diminution of value, relying instead on the regulation's stated purpose of preventing harm to the public—the old noxious use doctrine.

The U.S. Supreme Court, in turn, reversed the South Carolina Supreme Court and said that compensation was due based on the fact that the regulation denied "all beneficial or productive use of land."[14] Still, the Court left open the possibility that the state could avoid paying compensation, despite the total loss, if it could show that the land use prevented by the regulation constituted a nuisance under the state's common law. This standard, known as the *nuisance exception*, provides an objective basis, founded in the common law, for determining what constitutes a noxious use.

One question not clarified by the *Lucas* decision, however, was what extent of diminution was necessary to trigger automatic compensation. The regulation at issue in *Lucas* clearly met any standard the court could have applied because it caused a virtual total loss (the nuisance exception aside). The question therefore remained whether something short of full diminution would also qualify. The Supreme Court revisited this issue in *Palazzolo v. Rhode Island*,[15] which concerned a landowner who sought compensation when he was denied permission to develop waterfront property under a wetlands preservation law passed by the state of Rhode Island. The landowner claimed that the regulation met the requirement for compensation under *Lucas* because it denied him "all economically beneficial use" of the land, but the Court found that the regulation in fact left the owner with developable land worth $200,000, compared to his claimed loss of $3.15 million (a 94% diminution). Apparently, therefore, a diminution of at least 95% is required to constitute a "total" deprivation under *Lucas*.

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[14] *Id.*, p. 1015.
[15] 533 U.S. 606 (2001).

2.6. Wetlands and endangered species protection

Much recent litigation in the area of regulatory takings law has arisen in the context of regulations aimed at protecting wetlands and endangered species. Wetlands represent a natural resource that has only recently been recognized as providing important social benefits, including providing a habitat for wildlife, flood control, water quality maintenance, and both recreational and commercial use (Hartmann and Goldstein, 1994). The recent recognition of these values has led to the enactment of government regulations at both the state and federal level aimed at preserving wetlands. However, since wetlands predominantly exist on privately owned land, and because their primary value to the owner is usually for future development, these regulations have naturally generated a large volume of takings claims.[16]

Efficiency dictates that conversion of wetlands to development should occur to the point where the marginal value of land in development equals its marginal value if left in an undeveloped state. Thus, while it is probably efficient to convert some wetlands to alternative uses, especially in early stages of economic development, private landowners almost certainly would go beyond that efficient point if unrestrained because they would not internalize the full social value of the resource. Regulation is therefore necessary to achieve the efficient balance. Still, the question remains whether landowners are entitled to compensation for their resulting loss.

Generally, courts have held that the denial of permit to develop a wetland does not constitute a compensable taking of the owner's property. One argument in support of this position has been to claim that the proposed use of the land would represent a nuisance. However, in *Florida Rock Industries v. United States*, the U.S. Claims Court held that "the

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[16] According to Meltz, et al. (1999, p. 366, note 5), there were about 400 cases involving wetlands regulations between 1960 and 1990, of which about half raised the takings issue.

assertion that a proposed activity would be a nuisance merely because Congress chose to restrict, regulate, or prohibit it for the public benefit indicates circular reasoning that would yield the destruction of the fifth amendment."[17] As a result, the Court found that a taking had occurred. While this argument is consistent with the *Lucas* nuisance exception in its reliance on the common law for defining a nuisance, it fails to recognize the possible efficiency benefits that a departure from nuisance law might allow. Although nuisance law will often provide a useful approximation for efficient regulation, this will not always be the case. Indeed, the fact that wetlands were once themselves thought to be nuisances worthy of removal, but are now highly valued as an important natural resource by many, illustrates the point (Meltz, et al., 1999, p. 365).

Nuisance law is not the only applicable legal doctrine in wetlands cases; the "public trust doctrine" is also relevant. The public trust is an ancient doctrine that grants ownership of navigable waterways, shorelines, and the open sea to the public. According to this doctrine, landowners do not have a right to impair resources, like water, that fall within its purview (Lueck and Miceli, 2007, p. 237). In *Just v. Marinette County*, for example, the court held that "[a]n owner of land has no absolute and unlimited right to change the essential character of his land so as to use it for a purpose for which it was unsuited in its natural state and which injures the rights of others."[18] Based on this logic, the court found that a regulation preventing the landowner from filling a wetland was not a taking, even though the proposed use would not have constituted a nuisance.

Like resource preservation, the protection of endangered species, especially those endangered by human activity, has become an important objective of government policy (Boyle

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[17] 21 Cl.Ct. 161, 168 (1990).
[18] 201 N.W.2d 761, 768 (Wisc. 1972).

and Bishop, 1987). The most important legislative action in this regard was the passage of the Endangered Species Act (ESA) in 1973.[19] Under this act, the Fish and Wildlife Service (FWS) was authorized to "list" a species as endangered or threatened, and to designate the "critical habitat" of that species for special protection or management. The Act further stipulated that the criterion for listing a species is to be based on "the best scientific and commercial data, without reference to economic costs or private property impacts." In contrast, habitat designation is to be based on both scientific data and "economic impact and any other relevant impact," thus theoretically allowing consideration of landowners' interests (Meltz, et al., 1999, p. 392).

As with wetlands, the preservation of endangered species warrants government intervention because of the externalities involved (Harrington, 1981). However, the takings issue also arises because of the loss suffered by landowners as a result of the various restrictions on their allowed activities. For example, owners are prohibited from "taking" individuals of a listed species unless it is done in a good faith attempt to protect a person, where a "take" is defined to include harassing, harming, pursuing, or hunting a listed animal. More ominously for landowners, the FWS has defined "harm" to include significant habitat modification or degradation (Meltz, et al., 1999, p. 393), and in 1995 the Supreme Court upheld that interpretation as reasonable. [20]

On the other hand, land use restrictions under the ESA have generally produced relatively modest impacts on landowners' value, which, based on the prevailing legal standard requiring a landowner to show a virtual total loss in value, does not bode well for the success of taking claims.[21] Of course there are exceptions to this, such as when the owner of a stand of timber is

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[19] 16 U.S.C. §§ 1531-1544.
[20] *Sweet Home Chapter of Communities for a Great Oregon v. Babbitt*, 515 U.S. 687 (1995).
[21] Meltz, et al. (1999, p. 396) note that, as of 1999, not a single court decision finding a taking under the ESA had been reported.

prevented from harvesting it. The risk here, as will be discussed below, is that the threat of an uncompensated regulation can result in perverse (and costly) landowner incentives, such as a decision to clear cut the stand early to avoid its being declared a habitat, or to conceal the fact that an endangered species might reside in a certain locale.

3. Other tests for compensation

This section describes several tests for compensation that have been proposed in the scholarly literature on takings. As will be seen, these tests vary in their economic content and logical consistency. A test first proposed by Sax (1964) asserts that the government owes compensation when it acquires property rights for use in its enterprise capacity, as when it provides a public good, but it does not owe compensation when it acts as a disinterested arbitrator in a private dispute, as when it prevents one private party from imposing external costs on other private parties.[22] Rubenfeld (1993) elaborates on this test by arguing that a taking occurs when the government takes property for some productive use—a so-called "using"—as opposed to merely depriving the owner of its use. Rose-Ackerman and Rossi (2000) propose a similar standard.

In a second article, Sax (1971) argues that the government does not owe compensation for any actions that it undertakes to regulate external costs. Daniel Bromley adopts a similar perspective in arguing that paying compensation for such regulations would represent "…indemnification for an inability to continue to impose unwanted costs on others" (Bromley, 1993, p. 677). According to this view, which echoes the noxious use doctrine, the law does not (and should not) protect the right of landowners to engage in activities that impose harm on others. However, the difficulty with this test, as noted by Fischel (1985, p. 153), is that it offers

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[22] Rose (1983) makes a similar argument.

"no workable distinction…between land uses that create spillovers and those that do not. *Every economic activity can be argued to affect someone else*" [emphasis in original].

A similar delineation of property rights underlies the *harm-benefit rule*, which says that no compensation is due for regulations that prevent a landowner from imposing a harm on others (e.g., a regulation against pollution), but compensation is due for regulations that compel the landowner to confer a benefit on the public (e.g., a ban on development to preserve open space). Although this rule has some intuitive appeal, it too is unsupported by economic theory in the sense that a prevented harm can always be defined as a benefit, and a forgone benefit can be defined as a harm (Fischel, 1985, p. 158).

What is lacking in all of the preceding tests is a benchmark reflecting neutral conduct, which would serve as the basis for deciding when compensation should and should not be paid. Fischel (1985, pp. 158-160) offers such a benchmark in the form of his *normal behavior standard*, which is based on arguments first made by Ellickson (1973, 1977). According to this standard, no compensation is due for regulations that prevent landowners from engaging in "subnormal" behavior, but compensation is due for regulations that compel them to undertake "above-normal" behavior, where "normal" behavior is defined by community standards based on what landowners can reasonably expect to be able to do with their land. This "reasonableness standard" therefore replaces the arbitrary distinction between harms and benefits in the harm-benefit rule. What makes this an economic standard (rather than an arbitrary distinction) is that it economizes on the transaction costs of achieving an efficient land use pattern. Specifically, by setting the "zero compensation point" at normal behavior, the costs of compliance will be minimized because most landowners will engage in normal behavior automatically (i.e., without the need for government action).

Wittman (1984) proposes a similar compensation rule that is based on the behavior of the government rather than landowners. Specifically, he argues that the transaction costs of paying compensation will be minimized if compensation is limited to cases in which the government acts inefficiently, based on the presumption that "we would expect the government to act efficiently more often than not" (Wittman, 1984, p. 74). An important drawback of both the Fischel and Wittman standards, however, is that they fail to account for the role of the compensation rule in *creating* the proper incentives for landowners and/or the government to act efficiently. The next section deals with this issue.

In a very influential article, Michelman (1967) proposed a standard that is based on a comparison of the settlement (or transaction) costs associated with paying compensation, and the demoralization costs of not paying compensation, where the latter are defined to be those costs incurred by landowners and their sympathizers once they realize that they will not be compensated for their losses. According to Michelman's standard, if the settlement costs are lower, compensation should be paid, whereas if demoralization costs are lower, compensation should not be paid.[23]

Finally, Richard Epstein's view on the compensation question is based on the Lockean notion that the government should not stand in a preferred position compared to private citizens (Epstein, 1985, Chapter 2). In this perspective, the government has no more rights in its interactions with private citizens than does any other private citizen, inasmuch as the government is merely an agent of those citizens when they act collectively. Thus, when a government action wrongfully deprives a private citizen of valuable property, it should have to pay compensation, just as a private citizen would have to pay for imposing similar harm under nuisance (tort) law. In contrast, when a government action prevents a private citizen from imposing harm on other

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[23] See Fischel and Shapiro (1988), who discuss Michelman's test in light of more recent theories.

citizens—as, when it prevents that citizen from creating a nuisance (or noxious use)—it should

not have to pay, based on the right that private citizens have to be free from nuisances caused by

fellow citizens.[24] Epstein's view thus closely corresponds to the nuisance exception established

in the *Lucas* case.

4. Economic models of land use and regulation

Probably the most important contribution economists have made to the regulatory takings

debate has been the examination of the impact of compensation on the investment incentives of

landowners whose property is at risk of being taken or regulated. This line of research began

with the seminal paper by Blume, Rubinfeld, and Shapiro (1984) (hereafter, BRS), which

showed that paying full compensation for takings creates a moral hazard problem that causes

landowners to overinvest in land that is targeted for regulation. An implication of the BRS

analysis is the so-called "no-compensation result," which demonstrated that zero compensation is

efficient.   The BRS model is actually more subtle than this conclusion suggests, but the no-

compensation result has naturally received the most attention, and has provided a stimulus for

subsequent research, much of it aimed at providing countervailing arguments.

The no-compensation result was controversial principally because of its perceived

unfairness and apparent inconsistency with the constitutional requirement of just compensation

(at least for physical takings). From an economic perspective, however, the result is a simple

consequence of the well-known moral hazard problem associated with full insurance. This

section presents a simple version of the BRS model in which the government's decision to take

or regulate the owner's property is treated as exogenous. The model provides a unifying

framework for discussing the large literature on the economics of takings that has arisen since

BRS. Consistent with this literature, the basic principles derived from it are equally valid in the

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[24] See Epstein (1985, p. 36) and Epstein (1995, p. 133).

contexts of outright takings and regulation of property. Subsequent sections then examine various extensions to the basic model.

4.1. Exogenous probability of a taking

The BRS model uses the following notation:

$V(x)$ = market value of a piece of land after x dollars of improvements have been made, where $V'>0$, and $V''<0$;

p = probability that the land will be taken for public use;

B = fixed value of the land in public use if taken;

$C(x)$ = compensation paid to the owner in the event of a taking.

The timing of events is as follows: first the landowner decides how much to invest in improving his land, and then the taking/regulation decision occurs. The owner's initial investment is irreversible, so if the land is taken, its value in private use, $V(x)$, as well as the cost of the investment, x, are lost. Since the original BRS paper considered physical takings, the interpretations of the variables above reflect this. However, as just noted, the model and the results derived from it are equally valid in the context of regulatory takings with the following interpretations of the variables. Under a regulatory taking, $V(x)$ represents the *additional* market value that the landowner would realize in the absence of a regulation, or, equivalently, the loss in market value that would result from the regulation; B represents the benefit of the regulation or, equivalently, the external harm avoided by it; and p is the probability that the regulation is imposed.

Since the taking occurs randomly in this model, the only economic decision is the owner's choice of x. The socially optimal investment maximizes the expected social value of the land:

$$pB + (1-p)V(x) - x. \tag{1}$$

The resulting first order condition is

$$(1-p)V'(x) = 1, \tag{2}$$

which defines the optimal investment, x^*. Note that the amount of investment is decreasing in p.

Thus, as the probability of a taking increases, the landowner should invest less so as to reduce

the loss in the event of a taking.

Now consider the actual choice of x by the landowner. His goal is to maximize his

expected private return from the land, which is given by

$$pC(x) + (1-p)V(x) - x. \tag{3}$$

Note that this expression differs from (1) by the first term. The first order condition defining the

owner's optimal investment is

$$pC'(x) + (1-p)V'(x) = 1. \tag{4}$$

Comparing (4) and (2) immediately shows that $C'=0$ is a sufficient condition for efficiency; that

is, lump sum compensation induces efficient investment. A special case of lump sum

compensation is $C\equiv0$, or zero compensation. Intuitively, zero compensation prevents the owner

from overinvesting in his land because he internalizes the loss that would result if the land is

taken. This is the "no-compensation result" of BRS.

4.2. Endogenous probability of a taking

Several counterarguments have been advanced in favor of compensation, the most

common being that compensation is needed to prevent the government from over-regulating

(Johnson, 1977). These models can be categorized based on the assumption that is made about

the government's behavior.

4.2.1. Benevolent (Pigovian) government.

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A benevolent government is defined to be one that makes the taking decision to maximize social welfare. Fischel and Shapiro (1989) refer to such a government as "Pigovian" because it considers the social costs and benefits of its actions. To capture this formally, let the value of the land in public use, B, now be a random variable whose value is only learned after the landowner invests x. A benevolent government will only take the land if it turns out to be worth more in public than in private use, given x. Thus, once B, is realized, a taking will occur if and only if $B \geq V(x)$. Let $F(B)$ be the distribution function of B, where $F'(B) \equiv f(B)$ is the density. The landowner is assume to know $F(B)$, so that at the time he makes his investment decision, he knows that the probability of a taking is equal to $1 - F(V(x))$ for any x.

The socially optimal choice of x now maximizes

$$F(V(x))V(x) + [1 - F(V(x))]E[B \mid B \geq V(x)] - x$$

$$= F(V(x))V(x) + \int_{V(x)}^{\infty} B dF(B) - x. \tag{5}$$

The resulting first order condition is

$$F(V(x))V'(x) = 1, \tag{6}$$

which has the same interpretation as (2), with $F(V(x))$ replacing $1 - p$ as the probability that the land will not be taken. The expected private value of the land in this case is given by

$$F(V(x))V(x) + [1 - F(V(x))]C(x) - x, \tag{7}$$

and the resulting first order condition for x is

$$F(V(x))V'(x) + [1 - F(V(x))]C'(x)$$

$$+ F'(V(x))V'(x)[V(x) - C(x)] = 1. \tag{8}$$

Comparison of (8) and (6) shows that lump sum compensation ($C'=0$) is no longer sufficient for efficiency. Instead, compensation must be equal to the full value of the land at its efficient level of investment, or $C=V(x^*)$. Intuitively, full compensation is necessary to prevent the landowner

from either overinvesting or underinvesting to alter the probability of a taking (Miceli, 1991). Specifically, if $C(x)<V(x)$ the final term on the left-hand side of (8) is positive. Thus, the landowner will have an incentive to overinvest in order to reduce the probability of a taking since he expects to be undercompensated. Conversely, if $C(x)>V(x)$, he will have an incentive to underinvest to increase the probability of a taking since he expects to be overcompensated. Only a rule of full compensation, or $C(x)=V(x)$, will eliminate this incentive. Combining this result with the lump sum requirement yields the efficient rule, $C=V(x^*)$.[25]

The preceding compensation rule is not the only one that induces efficient investment in this case. Hermalin (1995) showed that two other rules are also efficient. Under the first, $C=B$; that is, the government must pay the landowner the full value of the public project in the event of a taking (the gain-based compensation rule). In this case, the landowner internalizes the social value of the land (as given in (5)) and therefore makes the efficient investment choice. Alternatively, suppose that compensation is zero in the event of a taking, but the owner has the option to keep the land by paying the government its social value, B. A rational owner will exercise this "buy-back" option if and only if $B<V(x)$. Thus, only efficient takings will go forward. (Note, therefore, that the government's decision about when to initiate a taking is immaterial, as long as it truthfully reveals B to the landowner.) Under this rule, the landowner's expected return is equal to

$$F(V(x))E[V(x)–B \mid V(x)>B] + [1–F(V(x))]\cdot 0 – x$$

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[25] This result was anticipated by Cooter's (1985) option approach under which the government acquires an option from the landowner that allows it to take the land at any point for a pre-specified price, P. If this approach were used, P would replace $C(x)$ in (7), and the first order condition in (8) would become $F(V(x))V'(x)+F'(V(x))V'(x)[V(x)–P]=1$. (Note that the C' term drops out here because the price is viewed as fixed with respect to the investment choice, x.) It follows that $P=C(x^*)$ for efficiency.

$$= \int_0^{V(x)} [V(x) - B] dF(B) - x. \tag{9}$$

Maximizing (9) with respect to x yields the first order condition in (6). Thus, the landowner makes the efficient investment choice.

In the above analysis, the landowner is able to affect the probability of a taking through investments that increase the private value of the land, *V(x)*. However, Innes (2000) notes that a landowner might also be able to affect the probability of a taking through investments that change the public value of the land. For example, he might be able to affect the desirability of his property as habitat for an endangered species that the government might seek to protect. This implies that the investment x shifts the distribution function of *B*, i.e., the distribution becomes *F(B,x)*. However, this does not change the fundamental result that when the landowner can affect the probability of a taking, zero compensation does not lead to efficient landowner investment. In this context, Innes shows that efficiency can be restored by compensating the landowner for the public value of the land if it is taken, or by employing a "negligence compensation" rule under which landowners receive compensation only if they have acted efficiently when investing in the public value of their land.

4.2.2. Non-benevolent (majoritarian) government.

More realistic models of government behavior suppose that it acts in the interests of the majority of landowners subject to budgetary restrictions (Giammarino and Nosal, 2005). Thus, suppose that the government makes its taking decision by comparing the value of the public project to the amount of compensation that it must pay in the event of a taking rather than to the opportunity cost of the land. Such a government is said to have "fiscal illusion" in that it only considers the budgetary impacts of its actions (BRS, 1984). In this case, the government will

initiate a taking if and only if $B \geq C(x)$, which implies that the probability of a taking is $1 - F(C(x))$, given x.

An obvious way to induce the government to make the correct taking decision is to set $C = V(x)$ (full compensation), but this rule will revive the moral hazard problem. One solution is to set $C = V(x^*)$, which solves both the fiscal illusion problem (because compensation is full), and the moral hazard problem (because compensation is lump sum). As an alternative, consider the gain-based rule which sets $C = B$. As we saw above, this rule solves the moral hazard problem, but a non-benevolent government will be indifferent between taking the land and not taking it. The landowner, however, will only want the taking to occur if $B \geq V(x)$, which is the efficient condition (given x). Thus, if the government follows the wishes of the landowner, the rule will be (weakly) efficient regarding the taking decision.

Consider next Hermalin's buy-back rule. Again, the landowner will control the taking decision in this case, and will do so efficiently since he will buy back the land if and only if $B < V(x)$. Because we showed above that this rule also solves the moral hazard problem, it will achieve efficiency of both the land use and takings decisions.

The final rule we consider involves a "threshold test" for compensation as first proposed by Miceli and Segerson (1994, 1996).[26] The rule works as follows: if the government acts inefficiently to take or regulate land, it will be required to pay full compensation, but if it acts efficiently, it will not have to pay. Formally, the rule can be written as

$$C = \begin{cases} V(x), & \text{if } B < V(x^*) \\ 0, & \text{if } B \geq V(x^*). \end{cases} \tag{10}$$

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[26] Miceli and Segerson (1994) also propose a threshold rule under which compensation hinges on whether the landowner acted efficiently in investing in the property. This rule is similar to the "negligence compensation" rule subsequently proposed by Innes (2000) in the context where the landowner's investment affects the public use value of the land..

The efficiency of this rule can be established as follows.[27] First, assuming that the landowner invested efficiently, the government will take or regulate the land if and only if it is efficient to do so because it wishes to avoid paying compensation, which would result in a loss of $B−V(x^*)$ when the taking is inefficient (i.e., when $B<V(x^*)$). As a result landowners will anticipate that only efficient takings (or regulations) will occur, and that compensation for these actions will be zero. Thus, they will choose x^*. This logic establishes that the Nash equilibrium under rule (10) will be efficient regarding both the land use and taking decisions.

As a positive matter, the rule in (10) has considerable appeal because it goes a long way toward explaining actual legal doctrine in the area of regulatory takings. Most obviously, the rule resembles the diminution of value test from *Pennsylvania Coal* because it establishes a threshold for when a regulation "goes too far." Specifically, compensation will be due when the regulation is inefficiently imposed. The threshold rule also provides a standard for applying the noxious use doctrine. Specifically, a noxious use can be defined as an activity that is efficiently regulated by the government, and for which compensation is therefore not required. Note that according to this interpretation, the noxious use doctrine and the diminution of value test are two ways of saying the same thing: the noxious use doctrine emphasizes cases where the government has acted efficiently in imposing a regulation and so compensation is not due (corresponding to the second line of (10)), while the diminution of value test emphasizes cases where the government has not acted efficiently and so compensation is due (corresponding to the first line of (10)).[28]

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[27] For a more detailed proof, see Miceli and Segerson (1994).

[28] Based on this interpretation, the rule in (10) provides a means of reconciling the apparently conflicting decisions in *Mugler*, *Pennsylvania Coal*, *and Keystone Bituminous Coal Assn.* See Miceli (2011, Chapter 5) for a detailed discussion of this aspect of the threshold rule.

Similar reasoning shows that the *Lucas* nuisance exception fits easily into this framework. Recall that the nuisance exception allows the government to avoid paying compensation when it regulates activities that would be judged a nuisance under the state's common law. But how is a nuisance defined by the common law? The usual standard is reasonableness, which is defined by asking whether a reasonable person would conclude that the amount of harm caused by the activity in question outweighs the benefit.[29] In other words, it is based on a cost-benefit calculation. Thus, the threshold for compensation implied by the nuisance exception is identical to that under the proposed threshold rule.

Extending this logic shows that the threshold rule provides an alternative "neutral conduct" point for applying the harm-benefit rule. Specifically, by setting *neutral conduct* equal to *efficient conduct*, a regulation can be said to "confer a benefit" (and hence require compensation) when it imposes inefficient restrictions on landowners, whereas it can be said to "prevent a harm" (and hence not require compensation) when it imposes an efficient restriction. The threshold rule is also consistent with Fischel's normal behavior standard, which, recall, set normal behavior based on a landowner's reasonable expectations (i.e., based on community norms) about permissible land uses.

4.3. Constitutional choice models

A different class of land use models is based on the notion that the government is not a distinct entity with motives of its own, but is merely the vehicle by which the citizens in a given jurisdiction act collectively to govern themselves, including deciding on land use policies and how to finance the cost of any required compensation. These "constitutional choice models" envision a process in which citizens initially hold a hypothetical constitutional convention to choose the compensation rule from behind a veil of ignorance about which particular parcels will

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[29] See Landes and Posner (1987, Chapter 2) for an economic theory of nuisance law.

be taken or regulated (Rawls, 1971). Then, these same citizens choose the amount (but not the specific parcels) of land to be regulated or taken. Given this, individual landowners then make their investment decisions without knowing if their land will be subject to the taking. Finally, the actual takings decisions are made. In this setting, landowners know that they are both potential targets of regulation but also beneficiaries of that regulation, and any compensation awarded to victims of regulation must be financed out of taxes levied on all citizens. In designing the compensation rule at stage one, citizens will therefore presumably take account of both sides of the public ledger and thus will not be overly generous or stingy with regard to compensation (Fischel, 1995, p. 211).

The formal model of this process, first developed by Fischel and Shapiro (1989),[30] uses the following notation:

n = total number of identical parcels subject to a taking risk;

s = number of parcels to be taken for public use, $s \leq n$;

$B(s)$ = social value of the taken land, $B'>0$, $B''<0$.

T = per-person tax liability to finance compensation.

All other variables are defined as above. The public good, B, is assumed to be pure in the sense that it is enjoyed by all landowners, including those whose land is taken. The tax is also assessed on all landowners.

In this model, citizen landowners, acting from behind a veil of ignorance, choose the number of parcels to take. However, since the specific parcels that will be taken are only revealed after landowners have made their investment decisions, in the initial state, each landowner assesses an equal probability, p, that his or her parcel will be taken, where $p=s/n$. The

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[30] Also see Nosal (2001).

probability that a parcel will not be taken is therefore $1–p=(n–s)/n$. The wealth of landowners in the "no-taking" and "taking" states, respectively, are given by

$$w_N = V(x) – T + B(s) – x \qquad (11)$$

$$w_T = C(x) – T + B(s) – x. \qquad (12)$$

The expected wealth of each landowner is therefore

$$E(w) = (1–p)V(x) + pC(x) – T + B(s) – x. \qquad (13)$$

The public budget must be balanced, so $nT=sC$, or, using the definition of p,

$$T = pC. \qquad (14)$$

(This assumes that the tax is assessed solely to finance compensation for takings.)

As in the BRS model, landowners choose x to maximize their expected wealth, taking the compensation rule as given. In the current model, they also take as given the amount of land to be taken, s (or, equivalently, the probability of a taking). The new element here is the tax payment, T. If landowners also treat T as fixed (i.e., a lump sum tax), then the first order condition emerging from (13) would be identical to that in (4), and the BRS result would obtain. (That is, $C'=0$ would be a sufficient condition for efficient investment.) However, suppose, more realistically, that taxes are assessed proportionately on property values. That is, let $T = tV(x)$, where t is the property tax rate. Also, suppose that compensation is defined as a proportion of land value, or $C(x)=\alpha V(x)$ for some parameter α. Substituting these expressions for T and $C(x)$ into (13), and taking the derivative with respect to x yields the first order condition

$$(1–p)V'(x) + p\alpha V'(x) – tV'(x) = 1,$$

or

$$(1–p)V'(x) + (p\alpha – t)V'(x) = 1. \qquad (15)$$

Now observe that, according to the balanced budget condition in (14), $tV(x)=p\alpha V(x)$, or $t=\alpha p$. Thus, the second term on the left-hand side of (15) vanishes, yielding (2). The landowner therefore makes the efficient investment choice for any value of α, i.e., any compensation amount. In other words, the compensation rule is irrelevant with respect to the land use decision. The reason for this result is that the compensation and tax distortions exactly offset through the balanced budget condition (Miceli 2008).

Finally, consider the choice of s, or how much land to take. Landowners also make this choice from behind a veil of ignorance to maximize (13), subject to the balanced budget condition in (14). Note that in making this choice, they recognize the fact that $p(s)=s/n$. The resulting first order condition for s, after canceling terms, is

$$nB'(s) = V(x), \tag{16}$$

which is the Samuelson condition for a pure public good. That is, land should be devoted to public use until the marginal benefit of the last unit taken equals its opportunity cost in private use. Thus, landowners authorize the efficient amount of takings for any given x. As was true of the land use decision, this result is independent of the form of the compensation rule and for the same reason. Thus, any compensation rule, including zero and full compensation, would yield efficient decisions under this model.

4.4. Dynamic models of development

The discussion of land use incentives to this point has been based on a static model of land use in the sense that the timing of the landowner's development decision was not an issue. This section extends the model to address two dynamic land use issues. The first concerns the timing of development, and the second concerns the impact of the landowner's expectation regarding the threat of regulation on the purchase price of the land.

4.4.1. The timing of development

The timing of development is an important issue because landowners faced with the threat of a regulation may be impelled to develop prematurely in order to reduce or eliminate that threat. For example, a developer may fill a wetland in order to pre-empt an impending ban on development. Similarly, a landowner may harvest the timber on his land prematurely to reduce the likelihood that it would provide habitat for a protected species (see, for example, Innes et al. 1998). In fact, Lueck and Michael (2003) find statistical evidence that timber plots with greater proximity to colonies of the endangered red-cockaded woodpeckers are more likely to be harvested early. Preemptive habitat destruction of this type could actually lead to an overall reduction in the population of a species that the land use restrictions are intended to protect.

A number of authors have presented theoretical models that investigate the impact of compensation on the timing decision (e.g., Miceli and Segerson, 1996; Innes, 1997; Riddiough, 1997; Turnbull, 2002; and Lueck and Michael, 2003). The basic insight regarding premature or preemptive development can be illustrated using the following two-period model of the land use decision, based on Miceli and Segerson (1996, Chapter 8). Let

V_N = present value of the land if developed now;

V_L = present value of the land if developed later;

p = probability that there will be a social benefit from preventing development in the future, given no development now;

B = the resulting social benefit from prohibiting development in the future (either in the form of an explicit benefit or a foregone harm);

V_0 = residual value of the land to the landowner if development is prohibited, where $0 \leq V_0 < V_L$;

C = compensation paid to landowners who are prohibited from developing in the future.

Assume that development in the present period cannot be prevented, and that once it goes

forward, the social benefit from prohibiting development can never be realized. Also assume that

if the land is not developed in period one and B is not realized in period two, then the optimal

course of action is to develop the land (i.e., there is no chance that B will be realized in some

future period).

The key question in this setting is whether or not it is optimal for the landowner to

develop the land now or to wait. If he develops now, the social (=private) value of the land is

fixed at V_N, whereas if he waits, the expected social value is $p(B+V_0)+(1-p)V_L$. Thus, waiting

preserves the option to use the land for the public project. It is therefore socially optimal to wait

if and only if

$$p(B+V_0) + (1-p)V_L > V_N. \tag{17}$$

From the landowner's perspective, if he develops now his return is V_N, whereas if he waits it is

$p(C+V_0)+(1-p)V_L$, which differs from the social value by the inclusion of C rather than B in the

first term. He will therefore choose wait if and only if

$$p(C+V_0) + (1-p)V_L > V_N. \tag{18}$$

Comparing (17) and (18) reveals that the only compensation rule that guarantees that the

landowner will make the correct decision is $C=B$. Any lesser amount of compensation, including

zero compensation, runs the risk of causing premature development.

In addition to affecting the timing of development, the compensation rule can also affect

landowners' incentives to reveal information about the public (e.g., conservation) value of their

land. For example, in the absence of compensation, landowners do not have an incentive to

cooperate with regulators seeking to collect information about public values prior to regulation.

Providing some form of compensation (perhaps conditional on landowner behavior or coupled with other conditions) can encourage landowners to cooperate with the collection of information or to reveal private information (Polasky, et al. 1997; Polasky and Doremus, 1998; Innes, et al., 1998).

4.4.2. Capitalization and compensation

In his highly influential article, Michelman (1967) argued that a landowner who bought a piece of property under the threat of an impending regulation would have no claim for compensation if the regulation is later enacted because the purchase price would have appropriately discounted the cost of the regulation. In other words, the price would have "capitalized" the taking risk. This is a persuasive argument that has found its way into the case law. For example, in *H.F.H. Ltd. v. Superior Court*,[31] the Court denied relief to a landowner whose commercial property was re-zoned as residential based on the argument that "The long settled state of zoning law renders the possibility of change in zoning clearly foreseeable to land speculators and other purchasers of property, who discount their estimate of its value by the probability of such a change" (p. 246).

To demonstrate the capitalization argument formally (Miceli and Segerson, 1996, Chapter 6), let

V = market value of a piece of property if unregulated;

V_R = market value of the property if regulated, where $0 \leq V_R < V$;

p = probability that a regulation will be imposed.

Suppose that the current owner wishes to sell the property after the regulatory threat has become public knowledge. Assuming that both buyers and sellers are risk neutral, the maximum amount a rational buyer would be willing to pay for the property would be

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[31] 542 P.2d 237, 246 (1975)

$$(1-p)V + p(V_R+C), \tag{19}$$

which reflects both the risk of the regulation and the expected compensation. In the case of zero compensation, the buyer would only pay $(1-p)V + pV_R < V$. Thus, if the regulation were subsequently imposed, he would not have a good argument for compensation since the sale price was appropriately discounted.

Epstein (1985, pp. 151-158) and Fischel and Shapiro (1988) both point out, however, that the seller *would* have a good argument for compensation since, at the time the possibility of the regulation was first announced, he suffered a capital loss equal to the difference between the discounted sale price and V, the value of the land in the absence of a regulatory threat. In particular, his loss would be $V-[(1-p)V+pV_R]=p(V-V_R)$. The compensation question thus reverts to the original owner.

One way to eliminate the original owner's loss would be to pay full compensation, or $C=V-V_R$, to the buyer at the time the regulation is actually enacted. Note that substituting this amount into (19) yields V, which means that the seller suffers no loss at the time of sale. Alternatively, suppose the original owner is given the right to assert a takings claim at the time of sale based on the probability that the regulation will be enacted later on. Stein (2000) refers to this as a "sale ripened" claim. In that case, the buyer would pay a price equal to $(1-p)V + pV_R$ since he would have no takings claim later (i.e., $C=0$), but the seller would receive compensation equal to $p(V-V_R)$ at the time of sale, yielding him an overall return of $(1-p)V+pV_R+p(V-V_R)=V$. Again, his loss is eliminated. In theory, therefore, both approaches to the problem of a sale in the face of a regulatory threat are equivalent in the sense that the original owner is fully compensated. In practice, however, the sale-ripened approach is probably inferior both because

it would entail more frequent litigation, and because it involves the difficult informational burden of calculating the risk of a future regulation.

4.5. Balancing risk and incentives

A final reason for paying compensation is to provide risk averse landowners with insurance against a taking or regulatory risk. In advancing this argument, Blume and Rubinfeld (1984) contend that the government needs to provide this protection because private insurance for takings risk is generally not available. (Also see Rose-Ackerman (1992) and Kaplow (1986, 1992).) Further, compensation must be mandatory, as by constitutional dictate, because a non-benevolent government might otherwise refuse to insure those parcels that it plans to take or regulate. As we have already seen, however, full compensation for takings creates the risk of landowner moral hazard, so the optimal compensation rule must balance risk-sharing and incentives.[32]

4.6. The social cost of funds

Aside from landowner moral hazard, the discussion above focuses primarily on alternative economic arguments for paying compensation. However, requiring compensation for land use restrictions would impose substantial resource requirements on regulatory bodies. For example, an early estimate by Goldstein and Watson (1997) suggested that requiring compensation for restrictions on wetlands development could cost regulatory agencies $350-400 billion in 1994 dollars, or roughly $500-560 billion in today's dollars. The revenue to pay compensation for regulatory takings would generally have to be raised through distortionary taxation, implying a potentially significant deadweight loss. This loss constitutes a cost of paying compensation that would have to be weighed against any benefits. For this reason, Innes

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[32] For a formal analysis of this trade-off in a takings context, see Miceli and Segerson (2007, pp. 49-50). For more general discussions of the trade-off, see Stiglitz (1974), Holmstrom (1979), and Shavell (1979).

(2000) argues for use of a compensation rule that provides efficient incentives with the lowest possible cost to the government. Note, for example, that the threshold rule in (10) would not entail any deadweight loss, since under this rule no compensation is paid in equilibrium.[33]

5. In-kind compensation

Government regulations are pervasive, and in many cases impose substantial burdens on property owners in terms of lost value. It does not follow, however, that property owners as a whole are necessarily made worse off by the imposition of such regulations,[34] or even that landowners directly subject to the regulatory restrictions are necessarily uncompensated. The reason for this paradoxical assertion is that the constitutional requirement of just compensation does not specify that compensation must always be *monetary*; it can also be *in-kind* (Epstein, 1985, Chapter 14).

To see what this means, note that in settings where regulations are widely imposed, as in the case of zoning restrictions, all property owners are equally burdened by the regulations, but they are also equally benefited by them. These benefits provide a form of implicit or in-kind compensation to all affected landowners. This argument implies that a compensable taking has not occurred when a regulation secures an "average reciprocity of advantage" across all property owners.[35] It also reflects Michelman's (1967, p. 1223) assertion that "[a] decision not to compensate is not unfair as long as the disappointed claimant ought to be able to appreciate how such decisions might fit into a consistent practice which holds forth a lesser long run risk to people like him than would any consistent practice which is naturally suggested by the opposite decision."

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[33] See Innes et al. (1998) and Innes (2000) for a more detailed discussion of the implications of the deadweight cost of government taxation for the design of compensation rules.

[34] See, for example, Truesdell et al. (2006) for evidence that wetlands regulations resulted in both "takings" and "givings," i.e., reductions in property values for some landowners but increases in values for others.

[35] *Pennsylvania Coal v. Mahon*, 260 U.S. 393, 415 (1922).

5.1. Neighborhood externalities and compensation

The economics of this perspective is based on the problem of "neighborhood externalities," which represent the spillover effects (costs or benefits) that neighboring property owners impose on one another as a result of their land use decisions (Miceli, 2011, pp. 136-139). For example, the manner in which owners use or maintain their property obviously affects their own values but also the values of neighboring owners. Because owners generally ignore these spillover effects, they may engage in socially inefficient practices. For example, they may skimp on maintenance, or paint their houses unusual colors (Davis and Whinston, 1961).

Often, the problem of neighborhood externalities is solved privately by means of agreements, explicit or implicit, among residents (e.g., Cannaday, 1994; Hughes and Turnbull, 1996). In some cases, however, transaction costs limit the ability of these sorts of private responses to the problem of neighborhood externalities. This is especially true for large scale externalities, such as those created by business operations or in very dense neighborhoods where residents are strangers. In these settings, it is in the interests of property owners to allow the government, acting in their collective behalf, to impose regulations that allow (or rather, "force") them to achieve an efficient land use pattern.

Based on this logic, regulations aimed at achieving this outcome would not be compensable takings because landowners as a group actually benefit from them. Thus, for example, a zoning regulation that prevents a landowner from opening a gas station in a residential neighborhood would *not* give rise to a taking claim because, while the claimant might be able to demonstrate a loss in value due to the restriction, this loss would only exist relative to a background in which all other landowners are prevented from engaging in such use. In other words, the claimant's "loss" is calculated based on his unilateral departure from the efficient land

use pattern. Thus, he would have no claim for compensation. Indeed, if the regulation is efficiently structured, it would actually *raise* the claimant's property value relative to the situation where no regulation is in place, and all landowners are free to pursue their private interests unimpeded (Schall, 1976). It is in this sense that all landowners are said to receive in-kind compensation for the restrictions imposed by broad (and efficient) government actions.

At the start of this chapter we asserted that, from an economic perspective, regulatory takings lie on a continuum with physical takings, and therefore should in principle be treated the same. The preceding argument, however, provides a possible economic basis for the dissimilar treatment of the two types of cases. Specifically, the nearly universal payment of compensation for physical takings, which typically involves the acquisition of only a few parcels, reflects the concentration of costs on those owners whose land is taken, and for which they receive little or no in-kind compensation. Thus, monetary compensation is necessary to satisfy the just compensation requirement.   In contrast, the denial of compensation for most regulations reflects their broad impact across property owners, with its promise of in-kind compensation through increased property value, as measured relative to a world in which no regulations are imposed on individual land use decisions.

5.2. The essential nexus and proportionality requirements

A different sort of argument for in-kind compensation was evaluated by the Supreme Court in the case of *Nollan v. California Coastal Commission*.[36] The case concerned the buyer of a beachfront cottage who wanted to build a larger house on the lot. The California Coastal Commission granted permission for the expansion, but only on the condition that Nollan would agree to allow public access to the adjoining beach. Although beach access would clearly represent a physical invasion of the owner's property, and hence would constitute a taking under

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[36] 483 U.S. 825 (1987)

ordinary circumstances, the Commission's logic was that the requisite compensation was implicit in the Commission's granting of the development right. Thus, it maintained, no further compensation was due. The Supreme Court disagreed based on the argument that there had to be an "essential nexus" between any conditions attached by the government to the development permit and the impact of the proposed development. Since in the *Nollan* case it found that no such nexus existed, the implicit transaction was not legally acceptable.

It is important to note that the Court's ruling did not invalidate the logic of the government's argument; rather it suggested that the proposed transaction was not acceptable based on the *facts* of the case. The Supreme Court further refined its position on this issue seven years later in the case of *Dolan v. Tigard*,[37] which involved a requirement by the City of Tigard that the owner of a hardware store had to deed a portion of her property to the city for use as a bike path and open space as a condition for its allowing her to expand the store. The city's argument in making this request was that the open space and bike path would mitigate the costs to the community arising from the expanded business operation. The Court in this case found, in contrast to *Nollan*, that there did exist a nexus between the city's demand and the proposed expansion since the bike path and open space would in fact mitigate the resulting damage. However, it also found that the costs imposed on the landowner by the demand were disproportionate in comparison to the social benefits. In order to avoid the need for explicit compensation, the government had to demonstrate a "rough proportionality" between the social harm from the proposed development and the value of the property that was being taken in exchange. In other words, the in-kind benefit received by the landowner had to provide sufficient compensation for her losses in order to meet the requirement of just compensation.

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[37]512 U.S. 374 (1994)

Note that the difference between the rulings in *Nollan* and *Dolan* is merely one of degree. Whereas *Nollan* found *no* relation between the government's demand and the landowner's proposed development, *Dolan* found an *inadequate* relation (Fischel, 1995, p. 349). Been (1991) nevertheless criticized the Court's awarding of compensation in *Nollan* (and presumably would have likewise criticized it in *Dolan*) based on the argument that the claimant was protected against what he deemed to be an unreasonable government demand by his option to exit the jurisdiction (Ghosh, 1997). However Fischel (1995, p. 345) notes that in *Nollan*, the regulation in question was tied to the particular location—namely, the beachfront—rather than to an activity that the claimant could easily have resumed in a different location. Thus, exit did not provide an adequate escape for Nollan. The exit argument applies better to the facts of *Dolan*, which involved a business that the claimant presumably could have relocated without substantially diminishing its value.[38]

6. Conclusion

This chapter has surveyed the law and economics of the regulatory taking issue, which concerns the application of the Fifth Amendment takings clause to the case of government regulations of property. The key question is whether or when a regulation constitutes a "taking" for which compensation is due. The debate has played out in the courts, the political sphere, and the scholarly literature, with economists contributing much to the conversation, especially in recent decades. Most of the economic literature has focused on how the compensation rule affects the trade-off between landowner incentives and government behavior: while payment of compensation potentially creates a moral hazard problem for landowners whose property may be subject to regulation, non-payment runs the risk of leading to over-regulation. This literature has

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[38] Of course, businesses often have location-specific goodwill that would be lost in the event of exit.

shed considerable light on the design of optimal compensation rules and how they relate to actual legal doctrines.

Still, it is important to recognize the limitations of economic theory in evaluating issues of this sort. After all, the Fifth Amendment may never have been intended to advance an economic theory of takings. A broader perspective therefore requires the allowance for other values besides efficiency, like fairness or justice.[39] Modern land use concerns also suggest a different conception of the optimal balance between private and public interests in contexts such as land preservation and species protection. The challenge for future research on the takings issue is therefore to incorporate these competing values and concerns in order to better understand both the case law and the incentive issues that relate to land use regulation.

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[39] See, for example, Tideman and Plassmann (2005) and Niemann and Shapiro (2008).

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