

# Efficiency-Dominating Economic Theory of Regulatory Takings: A Critique Note

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## Abstract

Economic models on regulatory takings primarily focus on efficiency. Specifically, they investigated how compensation (or its level) would affect the incentives of property right holders such as land use intensity, and how these effects would lead to social welfare. Various policy implications were then proposed. However, economic models overall have treated the issue of fairness as something to be considered in other disciplines, or, at the most, as only a secondary issue. Nonetheless, various factors related to pre-existing rights prevail for the cases brought to courts; the complaints of most private plaintiffs can be summarized into a single sentence that *compensation was unfair*. Therefore, the ultimate goal should be to provide a more workable formula that policy makers and judges can utilize in real legislation and dispute resolution. For this goal, in this paper, we investigate a representative economic model of regulatory takings in order to show that it falls short of reflecting the reality and the actual rulings of the Supreme Courts in many critical aspects. We then briefly explore a different approach that accommodates the real world much better.

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## I. Introduction

Michelman (1967, pp. 1193-1194) argued that using the Kaldor-Hicks efficiency test to determine whether to compensate for a regulation is likely to be erroneous, “*at best reflecting a careless confusion of two quite distinct questions*”: i.e., the legitimacy of a regulation vs. the obligation to compensate. Indeed, efficiency of regulation has been occasionally used to determine whether compensation is required. However, the focus also should be made on fairness, which we generally define as the requirement that the legally recognized right of the regulated be not significantly infringed.

In particular, economic models overall have treated the issue of fairness (or protecting property rights in its simplistic sense) as something to be considered in other disciplines, or, at the most, as only a secondary issue. Yet, real life disputes force us to consider the fairness issue seriously, in spite of the importance of economic efficiency. In fact, various factors related to fairness strongly prevail for cases that are brought to courts; the complaints of most private plaintiffs can be summarized into a single sentence that *compensation was unfair*.

Economic models on regulatory takings developed so far can be categorized, depending on the extent to which they recognize the consideration of pre-existing rights. One group is represented by its complete ignorance of the prevailing right and by its dominant focus only on the efficient use of property. We refer to these views as the “efficiency-dominating economic theory (EDET).” Efficiency consideration is termed “dominating” as researchers overwhelmingly focus on the landowner’s efficient behavior through the regulation, *regardless of why* it was introduced to begin with.

Specifically, EDET investigated how compensation (or its level) would affect the incentives of property right holders such as land use intensity and the resulting social welfare. Based on these inquiries, various implications on compensation were derived.<sup>1</sup> EDET particularly focuses on the landowner’s incentive of excessive development, and

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<sup>1</sup> Among many others, see Miceli and Segerson (1994), Ghosh (1997), Hermalin (1995), Riddiough (1997), Innes (1997, 2000), Polasky and Doremus (1998), Bohn and Deacon (2000), Lueck (2006), Lueck and Miceli (2007), Schieffer (2007), Innes and Frisvold (2009), Nosal (2001), and Pecorino (2011). Although some of the articles in this footnote also discuss physical takings, we include them here as they bear direct relevance to our major discussions in this paper.

intends to align the incentive with that of the social planner. A representative example is Miceli and Segerson (1994) where attaining efficiency was the dominant goal to the authors. Similar arguments were followed by Lueck (2006), Lueck and Miceli (2007), and Miceli (2012). A most distinct implication from these theories is that, if a regulation is efficient, no compensation is fully justified *regardless of* why it was introduced.<sup>2</sup>

While the incentive of excessive regulation is also dealt with in EDET, the purpose of that consideration lies in the efficient use of land, which is the ultimate goal in EDET. Compensation schemes are included, but they are no more than a compliance mechanism to attain efficiency, without any consideration of fairness. In addition, the government, although its fiscal-illusion is sometimes recognized, is usually assumed to be both *neutral* in terms of regulatory motive and *capable* in terms of regulatory implementation. Thus, EDET is characterized as the core among the existing economic literature that shows the greatest generosity towards the no-compensation policy.

As the major goal of this paper, we critically reexamine these aforementioned claims and the underlying characteristics of EDET, by utilizing on its simplified model. More specifically, we extensively investigate the model of Miceli (2012, pp. 113-150, 182-185) and Miceli and Segerson (1994), which are regarded as primary economic studies on regulatory takings. The ultimate purpose of this investigation lied in envisioning a more workable system than EDET, as will be outlined at the end of this paper that briefly summarizes an extensive work of Kim and Lee (2017).

Miceli and Segerson (1994) has also been cited widely particularly in legal studies where three observations are distinct. First, these legal studies tend to regard Miceli and Segerson's work as a fairly representative economic study; examples include Bell and Parchomovsky (2001, p. 288), Fenster (2007, p. 708), and Washburn (2011, p. 88). Second, their work is also cited as an inquiry that deals with the trade-off between the inefficient use of land on the one hand and the inefficient regulation on the other (Gazzini, 2010, pp. 44-45; Lavoie, 2012, pp. 237-239). Third, their model is described

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<sup>2</sup> A handful of economic arguments, in contrast, have suggested that having no compensation can cause undesirable consequences. See Riddiough (1997), Innes (1997, 2000), Polasky and Doremus (1998), Bohn and Deacon (2000), Schieffer (2007), and Innes and Frisvold (2009). An interesting observation is that, even within these arguments, the landowner's right to develop their land usually is not recognized.

as a mechanism utilizing compensation to force the government and landowners to internalize the costs of the regulatory and land use decisions, respectively: i.e., cost-internalization is the primary rationale for compensation as in Dana (1995, p. 697), Been (2003a, p. 50; 2003b, p. 53), and Levinson (2000, p. 349; 2005, pp. 968-969).

The third observation above deserves special mention. At the equilibrium of Miceli and Segerson (1994), there is neither overuse of land nor excessive regulation simply because of the cost-internalization function of compensation. This conclusion particularly leads to a further critical justification that no compensation is reasonable as long as the regulation is efficient. However, we cautiously submit that it is unclear whether legal scholars, while citing Miceli and Segerson, accurately understood this justification for *always no compensation* as the equilibrium outcome. Perhaps, the legal scholars viewed the model of Miceli and Segerson as a system where compensation and no compensation coexist. If so, it would obviously be a mistaken understanding. Thus, another goal of our paper is to clarify this possible misunderstanding.

The paper is organized as follows. In Section II, we offer a simplified version of EDET and attempt to tease out the assumptions and model settings that render the main conclusion of EDET. In Section III, we suggest that the EDET analyses, overall, do not reflect most of regulations and related rulings of the Supreme Courts. In Section IV, based on a more extensive work by Kim and Lee (2017), we explore different approaches to better accommodate the real world. Section V concludes the discussion.

## **II. Efficiency-Dominating Economic Theory (EDET) of Regulatory Takings: Essences and Limitations**

### **1. Essence of EDET**

#### **1) Skeleton of the Miceli-Segerson Model: A Simplified Version**

We consider a representative model of EDET in a simplified manner. The landowner invests  $x$  in the land. The price of  $x$  is one.  $V(x)$  is the revenue function in the second period, which is also understood as the economic value of the land given the investment level.  $V$  monotonically increases with concavity (i.e., for all  $x \in [0, \infty)$ ,  $V'(x) > 0$  and  $V''(x) < 0$ ). In the absence of a regulation the landowner determines

the profit-maximizing level of  $x$ , which we call  $x_0$  (i.e.,  $x_0 \equiv \operatorname{argmax}_{\{x\}} V(x) - x$ ). The externality cost,  $E$ , is often used in the economic models by which a regulation is introduced to make *all* previous investment completely *sunk*. Then, the socially optimal level of  $x$  with consideration of the risk of  $E$  will differ from  $x_0$ . Thus, the social planner needs a regulation and a compensation scheme to narrow the gap.

The government and the landowner only know the probabilistic distribution of  $E$  in the first period, and the value of the externality is realized only after the landowner has made some irreversible investments. For simplicity, the distribution of  $E$  is assumed to be discrete (i.e.,  $E_h$  or  $0$ ) as shown in (1). After realization of the actual value of  $E$ , a decision is made concerning the regulation. In the case of introducing the regulation,  $E$  is avoided. Otherwise,  $E$  affects society. The basic assumptions regarding the realization of the externality are as described below.

$$\Pr(E = E_h) = p; \Pr(E = 0) = 1 - p, \text{ where } E_h > V(x_0), p \in [0, 1]. \quad (1)$$

Thus, in the case of  $E_h$ , “*it is efficient for the government to impose a regulation prohibiting development whenever the realized cost of the externality exceeds the private value of the land.*” (Miceli, 2012, p. 125) In this context, we call “ $E_h > V(x_0)$ ” an “efficient interruption assumption.” Under the efficient interruption assumption, the optimization for the social planner can be summarized as in (2).<sup>3</sup> From (2) the socially optimal value of investment,  $x^*$ , is derived utilizing the characteristics of  $V$ ,  $V'(x) > 0$  and  $V''(x) < 0$  (i.e.,  $x^* \equiv \operatorname{argmax}[(1 - p)V(x) - x]$ ). Note that  $x^*$  should be smaller than  $x_0$ . This suggests that the socially desirable level of investment shrinks.

$$\operatorname{Max}_{x \in [0, \infty)} (1 - p) \cdot V(x) - x. \quad (2)$$

When a regulatory taking is in place, compensation is made based on the predetermined compensation scheme,  $\text{Comp}$ . Miceli offers two rules. One is the ex-ante rule described in (3): compensate what the landowner expected from the

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<sup>3</sup> Detailed proof on this derivation is available from the authors upon request.

investment if the investment level was optimal or none if it is excessive. The other is the ex-post rule described in (4): compensate none if the regulation vitiating the investment is efficient or what the landowner expected from the investment otherwise.

$$\text{Ex-ante Rule: } \text{Comp} = 0, \text{ if } x > x^*; \text{ Comp} = V(x), \text{ otherwise.} \quad (3)$$

$$\text{Ex-post Rule: } \text{Comp} = 0, \text{ if } E = E_h; \text{ Comp} = V(x), \text{ if } E = 0. \quad (4)$$

### ■ Equilibrium Outcome of the Two Compensation Schemes

We first examine the ex-ante rule. Suppose that the government, who is the late mover in this sequential game, cares about its own “*budgetary impacts of its actions*” (Miceli, 2012, p. 173). When  $E = 0$ , based on (3), the payoff to the government without the regulation is 0, which is greater than that with regulation (i.e.,  $-\text{Comp}$ ). Thus, no regulation is introduced. When  $E = E_h$ , a regulation is introduced as its payoff with regulation,  $-\text{Comp}$ , is either 0 if  $x > x^*$  or  $-V(x)$  if  $x \leq x^*$ . These are always greater than its payoff without the regulation (i.e.,  $-E_h$ ) because Miceli, like Levinson (2000, p. 35), assumes that the government that fully internalizes the benefits of regulation is the bearer of the externality cost.<sup>4</sup> In summary, under the ex-ante rule, the regulation is used only when  $E = E_h$ .

Now, knowing this strategy of the government, the landowner finds the best strategy to maximize the payoff. If it is realized that  $E = 0$ , the payoff is  $V(x) - x$  due to no regulation. If  $E = E_h$  and thus a regulation is expected, the payoff will be  $V(x) - x$  if  $x \leq x^*$  and  $-x$  if  $x > x^*$ . Thus, the landowner’s decision is summarized as (5).

$$\text{Max} [\text{Max}_{x \in [0, x^*]} (1 - p) \cdot V(x) + p \cdot V(x) - x, \text{Max}_{x \in (x^*, \infty)} (1 - p) \cdot V(x) + p \cdot 0 - x]. \quad (5)$$

The first term in the bracket of (5) is an increasing function of  $x$  for  $x \leq x^*$ .<sup>5</sup> Thus,

<sup>4</sup> Recall that  $x_0$  is greater than  $x^*$ . When  $x \leq x^*$ ,  $E_h - V(x) > E_h - V(x_0)$ . Also, by the efficient interruption assumption (i.e.,  $E_h - V(x_0) > 0$ ),  $E_h - V(x) > 0$ . Thus, it holds that  $-V(x) > -E_h$ .

<sup>5</sup> The derivative of the first term with respect to  $x$  is  $V'(x) - 1$ . By the concavity assumption of  $V(x)$ ,  $V'(x) - 1$  is a decreasing function of  $x$ . Meanwhile, by the definition of  $x^*$  for (2),  $(1 - p) \cdot V'(x^*) - 1 = 0$ , which can be rearranged as  $V'(x^*) - 1 = p \cdot V'(x^*) (> 0)$ . Thus,  $V'(x) - 1$  should have a

its maximum is  $V(x^*) - x^*$  when  $x = x^*$ . The second term is identical to (2), except with a condition that  $x > x^*$ , so it is smaller than when  $x = x^*$  by the definition of  $x^*$  (i.e.,  $x^* = \text{argmax} [(1 - p) \cdot V(x) - x]$ ). Then, as long as  $p > 0$ , the best investment level is  $x = x^*$ . In conclusion, the government's strategy is efficient regulation and the landowner's strategy is efficient use of land in equilibrium.

We next examine the ex-post rule. When  $E = 0$ , based on (4), the payoff to the government with the regulation is  $-\text{Comp} = -V(x)$ , which is smaller than that with no regulation (i.e., 0). Thus, no regulation is better. When  $E = E_h$ , regulation is introduced as the payoff with the regulation,  $-\text{Comp} = 0$  is always greater than its payoff without the regulation (i.e.,  $-E_h$ ). Knowing this, the landowner's optimization is expressed as (6), which is equivalent to (2). Thus, the solution is  $x = x^*$ . Therefore, both parties have efficient strategies in equilibrium also under the ex-post rule.

$$\text{Max}_{\{x\}} (1 - p) \cdot V(x) + p \cdot 0 - x. \quad (6)$$

## 2) Summary of the EDET Arguments

Miceli derives two major conclusions. First, both the ex-ante and ex-post rules are *efficient*. The second and related conclusion is that the two compensation rules are *indifferent* in terms of equilibrium outcome such as land use intensity and the decision to regulate. Since Miceli and Segerson (1994), these conclusions have been repeatedly endorsed such as in Lueck (2006), Lueck and Miceli (2007), Miceli (2012), or at least significantly in Ghosh (1997).

Let us summarize the four-fold characteristics of EDET. **1)** There is no recognition of pre-existing rights as in most other economic studies on takings. **2)** EDET attempts to resolve the *trade-off* between the overuse incentive of owners and the over-regulation incentive of the government (Miceli, 2012, p. 123). **3)** Only if regulation is efficient, (at least by the ex-post rule) no compensation is fully justified *regardless of* the fundamental cause of introducing the regulation. **4)** EDET assumes that the government body is neutral in terms of the regulatory motive and is technically efficient. In

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positive value for  $x \leq x^*$ , which makes the first term in (5) an increasing function of  $x$ .

conclusion, efficiency indeed dominates in EDET. In the next subsection, we examine the possibilities of the shortcomings of the EDET model from technical points of view before we launch fuller investigations on its substantive inadequacy in Section III.

## 2. Conceivable Errors in Technicality or the Assumptions Used

### 1) Over-Emphasis on Zero Compensation

For the two compensation schemes in (3) and (4), the amounts for each case are rather peculiar. When full compensation is not an option, the amount is fixed at zero, i.e.,  $Comp = 0$ . Yet,  $Comp$  does not need to be zero simply to induce efficient behaviors in (5) and (6). Any fixed amount is sufficient to precipitate on the same effect.<sup>6</sup> This has already been recognized not only for physical takings since Blume, Rubinfeld, and Shapiro (1984) and Cooter (1985) but also for regulatory takings; for example, as Lueck (2006, p. 10) suggests “*any lump sum rule is consistent with efficiency.*”

Thus, zero compensation is not the necessary condition for efficiency, such as for example, in (4). Certainly, Miceli (2012) did not specifically advocate zero compensation, based on his statements such as “*it will not be required to pay any compensation*” (p. 124) when he provides an overall description of the compensation scheme. However, when he deals with equations (for example, his equation (5.1) on p. 124) or derives solutions, readers gain an impression that he seems to believe in zero compensation, such as in his statement that “*in equilibrium, therefore, both parties will act efficiently, and no compensation will actually be paid*” (p. 124).<sup>7</sup>

The correct statement should rather be: “*In equilibrium, .... a fixed amount will actually be paid.*” A connotational difference appears to be substantial. As can be

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<sup>6</sup> In fact, many damage measures in contract law exist that do not induce overreliance by the promise, as shown, for example, by Kim and Kim (2014) in their summary of the literature. Likewise, investment-invariant schemes can be designed so that overinvestment is deterred.

<sup>7</sup> Miceli suggests the purposes of his model: “[T]he goal here is more ambitious than simply proposing an efficient rule; rather, it is to **(a)** develop an efficient rule that also **(b)** explains actual legal practice” (Miceli, 2012, p. 123; **(a)** and **(b)** added). However, in addition to various issues of technicality and unrealistic assumptions as explained in this subsection, we reason that none of the above purposes, **(a)** or **(b)**, has been effectively established primarily because he does not adequately explain his choice of the no-compensation solution.



inferred from (3), compensation does not have to be zero. Assume that Comp is replaced by  $V(x^*)$  when  $x > x^*$  among numerous fixed amounts. There is no change in equilibrium, but this new amount makes much more sense considering there has been solid ownership of the land. Comp can be replaced even by  $V(x_0)$  as suggested in Cho and Kim (2002) when the landowner makes no contribution to the contingency E. As emphasized by Kim and Lee (2017), a compensation scheme with varying amounts reflects the reality much better than this all-or-nothing scheme of EDET.

## 2) Strong Assumptions about the Government

Various sorts of opportunism by the government exist, such as the degree of legitimacy of the real causes of the realization of E. It is well known that regulations are often the outcome of lobbying efforts of interest groups. In terms of physical takings, *Kelo v. City of New London* [545 U.S. 469, 2005] representatively shows that a decision to take can be easily influenced by the interests of an exclusive group. Somin (2015, Ch. 3) offers good explanations of extensive abuse of *public purpose*.<sup>8</sup> Pure redistribution without compensation due to the lobbying efforts triggers a high level of resistance of the losers, that is, *demoralization costs* (D) of Michelman (1967)<sup>9</sup>.

EDET also assumes that  $V(x)$  in (3) and (4) represents accurately measured “full compensation.” It is well known in the takings literature that systematic under-compensation would lead to excessive takings. The exact same principle also applies to regulatory takings. Thus, an inefficient regulation (even when  $E_h$  has a very small positive value and is far less than  $V(x)$  in terms of the previous simple model) can be implemented if the required amount of Comp is systematically under-evaluated. We

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<sup>8</sup> For example, Cho and Kim (2002) and Kim and Park (2010; 2012; 2016) show how seriously eminent domain has been abused under the pretext of public interest by both private interest groups and public servants in Korea. Certainly, we do not believe at all that these irregularities are confined either to Korea or to physical takings; such irregularities are only a matter of incentives under wrongfully designed laws.

<sup>9</sup> Michelman (1967, p.1214) defines demoralization cost as “*the total of (1) the dollar value necessary to offset disutilities, which accrue to losers and their sympathizers, specifically from the realization that no compensation is offered, and (2) the present capitalized dollar value of lost future production (reflecting either impaired incentives or social unrest) caused by demoralization of uncompensated losers, their sympathizers, and other observers ....*”

are aware that other economic theories often adopt this strong assumption concerning accurate appraisal. Nonetheless, we see a tendency that this caveat with regard to the under-compensation bias is not discussed in economic models, particularly in EDET that adopts zero compensation rather than some positive fixed-amount. However, we envision that a more desirable theory should account for the fact that the existence of under-compensation bias itself affects social welfare because the bias will obviously increase the resistance of the losers, and thus  $D$  in Michelman's theory.

### 3) Incomplete Information

EDET of regulatory takings heavily hinges on  $E$ ,  $V(x)$ ,  $x^*$ ,  $p$ , and so on. However, such information is very difficult to verify, as Fischel bluntly suggested.<sup>10</sup> Suppose, in the EDET model earlier, a land-use regulation to alleviate the problem of air pollution broken out in the second period is most likely to be efficiency-enhancing. Recall that EDET treats the government as being efficient in regulatory implementation. However, EDET seems to overestimate the ability of the third party, including courts, to make complex calculations about the efficiency of various government regulations.<sup>11</sup>

We particularly note that, in EDET, *everyone* knows the probability of the undesired contingency,  $p$ . Experience has persistently told us that severe asymmetry exists regarding  $p$ . In this situation, the government can announce an over-estimated value,  $p^+$  ( $> p$ ), to the public. As  $p$  is increasingly over-estimated, the announced value as an optimal level of investment by (2) becomes smaller. Thus, under the ex-post rule, for example, the amount of compensation will fall short of  $V(x^*)$  even if the regulation is inefficient. Overall, excessive regulations will be used under  $p^+$ . Since no third party can pinpoint the over-estimation, both excessive regulation and insufficient compensation will most probably perpetuate equally under the ex-ante rule. We conclude that all these irregularities originate from the unrealistic assumption of

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<sup>10</sup> "Miceli and Segerson's [1994] work is given no more than a brief mention here because their rules still begs the question of how judges are to decide about the efficiency of the proposed land use and the proposed regulation." (Fischel, 1995, p. 205; [ ] added)

<sup>11</sup> The problem of asymmetric information is recognized as an insurmountable obstacle for implementing the EDET model in practice, as emphasized representatively by Innes (1997, p. 405).

complete information, and that such assumption should be dropped in order to construct a more reasonable formula as will be envisioned in Section IV.

#### **4) Independence between Externality and Investment**

The magnitude of externality (or a random variable  $E$ ) is independent of the level of land investment,  $x$ , in the model of EDET. In other words, the level of  $x$ , while determining the degree of sunk cost upon introducing a regulation, is totally irrelevant to the expected value of benefits of the regulation. This is another peculiar phenomenon, even taking into account the possible merit from simplicity in modeling.

The independence between  $E$  and  $x$  can apply to reality, but only to a substantially limited extent. Consider a contingency that leads to constructing a hydroelectric dam. In this situation,  $x$  would indeed be irrelevant to the realization of  $E$  (or the public benefit of the project). In contrast, this independence cannot be assumed to many cases of regulatory takings that have been dealt with at the U.S. Supreme Court as will be shown in Section III.<sup>12</sup> The bottom-line is that the size of  $x$  often affected the level of  $E$ .

We are then bound to ask why this independent relationship was adopted in the EDET model. One pure speculation is that EDET is built upon the earlier takings model such as Blume, Rubinfeld, and Shapiro (1984) and Cooter (1985) where a certain random force makes it necessary to take private lands for public facilities. This speculation is reinforced by the feature embedded in the EDET model that *all* investments are made sunk, as in the aforementioned cases of physical takings. However, these characteristics of EDET (i.e., independence between  $x$  and  $E$  and sinking all investments) have fairly limited applicability for general cases of regulatory takings. This issue is more thoroughly investigated in Sections III.

### **III. Fundamental Inadequacy of EDET**

#### **1. Procedural Aspects of EDET: Limited Applicability**

Fundamental inadequacy of EDET stems from the fact that EDET lacks essential

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<sup>12</sup> Moreover, many regulations take the form of setting the maximum level of  $x$  or vitiating a portion of the investment that has been already made.

implications either for resolving disputes related to regulatory takings or for developing relevant doctrines. The first inadequacy, which is dealt with in this subsection, concerns the “procedural aspects” of the 2-period complete information game. These procedural aspects include the sequential order in which a regulation is introduced after the realization of externality ( $E_h$ ) in the second period, the assumption that all information about the *future* possibility of regulations is provided to landowners beforehand, and another procedural feature that *all* investments are made sunk with a regulation.

Firstly, we suggest that the sequential setting in EDET is inadequate in explaining the majority of existing regulations. The vast majority of existing regulations are “act-based.” The act-based regulation adopts a rule under which a party is subject to sanctions “*for the **expected** harm due to an act, regardless of whether harm actually occurs*” (Shavell, 2004, p. 478, emphasis added). In contrast, a certain value of  $E_h$  was compared with  $V(x)$  in the Miceli model earlier so that  $E_h$  might well be interpreted as an occurrence of harm or imminent harm. However, act-based regulations mostly rely on the *expected value* of future harm.

Second, it is unrealistic to assume that all critical information concerning a possibility of future regulations is fully provided to landowners and that the government’s decision to regulate is then made after all investments are completed. Rather, either many regulations are in place prior to land use decisions of landowners or they are unexpected by the landowners. Thus, the EDET model’s applicability is narrowly confined.

Allegedly, the “realization of E” above could be interpreted as an event that eliminates any uncertainty regarding the judgment that harm will be greater than  $V(x)$ .<sup>13</sup> However, various facets of inconsistency with the reality appear to remain in this extended interpretation of the model. *Most* people start to perceive E *after* the government notification of an actual regulatory implementation. Moreover, it is even more peculiar to assume that landowners, in the first period, know the probability of regulation ( $p$ ) of the next period. Note that  $p$  in the EDET model plays a pivotal role in

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<sup>13</sup> Miceli (2012, p.127) actually stated that “*the high value of the externality is realized.*” Thus, it might be plausible that, upon realization of  $E_h$ , only its certainty value is known rather than the externality actually taking place.

determining the size of investment. Nonetheless, we have hardly witnessed cases where government agencies announce the level of  $p$  in an accountable manner.<sup>14</sup>

In fact, the sequence of regulation and investments may affect the efficiency result in the model. For example, Schieffer (2007, pp. 11-13) attempts to offer a more realistic sequence with regard to the Oregon's Measure 37. It is shown that a full compensation rule is efficient under the sequence in which landowners apply for permission to build and then government, based on its *own* updated information concerning the expected value of externality, decides whether to permit it or to block it with compensation (i.e., regulation). Although this regulatory process may not apply to all situations, we suggest that it is a scenario that reflects the reality of the landowner's information constraints more closely than does EDET.

Finally, the third procedural aspect of EDET, whereby *all* investments are made sunk is fairly inconsistent with our real-world observations. For example, most zoning regulations take the form of "prohibiting development" with threshold conditions such as "beyond density A" or "except use B," or "from time C," to name a few. It is difficult to imagine a regulation that obliterates all investments. Even under the ex-ante rule, the regulation would most probably order the elimination of part of  $V(x)$  at the most. The regulatory feature of an all-or-nothing adjustment has very limited applicability.<sup>15</sup>

In sum, most existing regulations are "act-based" and impose restriction on "a certain specified act" that will be undertaken after "a certain specified time (in the future)." EDET's procedural settings are at great odds with these characteristics.

## **2. Critique of the Indifference Argument Regarding the Two Compensation Rules**

Regulatory takings without compensation are mostly followed by strong resistance of

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<sup>14</sup> Hermalin (1995, pp. 66-67) further points out that "*regulatory takings ... often involve asymmetric information, since the state typically enacts regulations without knowing exactly who will be affected and, therefore, ... what benefit has been taken from each affected citizen.*" To the extent that these arguments hold, it is more unrealistic to assume that landowners determine their investment levels utilizing  $p$ .

<sup>15</sup> This regulatory feature of all or nothing adjustment is critically related to the assumption criticized earlier that the level of externality is not a function of the amount of investment.

the regulated, thus demoralization costs (D) of Michelman (1967). Thus, ignoring D results in underestimating the social costs inflicted by regulatory takings.<sup>16</sup> If D is removed from the analysis, Michelman's theory degenerates to the Kaldor-Hicks efficiency criterion. Then, by the corresponding optimization in Equation (6), one can show that efficient investment is induced, even with zero compensation. Meanwhile, under the ex-ante rule, efficient investment also is induced by Equation (5) as it is assumed that there is no D. Note that compensation is being treated merely as income transfer. Therefore, EDET concludes that the two rules are indifferent.<sup>17</sup>

However, this indifference conclusion should be subject to change once we include D as one of social costs. Choice of which rule to use affects the size of the cost, which changes the efficiency implication substantially. Suppose that the regulation, designed to confer benefits for the general public, seriously restrain the (firmly-established) rights of landowners to lease, mortgage, or easement as well as the ability to exclude. Suppose this burden is distributed disproportionately only to a group of landowners. Under these circumstances, no compensation will cause a large magnitude of resistance and demoralization cost under the ex-post rule. Thus, use of the ex-ante rule would allow the regulator to avoid the unnecessary social costs.

Therefore, the two rules are practically not indifferent even from the utilitarian perspective. More importantly, to our knowledge, no jurisdiction has treated these two rules indifferently. Below we elaborate on the disparity, which varies widely depending on how firmly the restrained right has been legally established.

### **1) Inadequacy of the Ex-Post Rule when Regulating Well-Established Properties for Public Use**

A significant number of regulations belong to this situation; the state takes a part of the property rights of a person to confer benefits to the large community. Consider, for

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<sup>16</sup> Ghosh (1997, p. 158) also pointed this out: “...most economic models implicitly assume that demoralization costs are zero. This assumption provides a way to reconcile the economic prediction of no compensation with Michelman's conclusion.”

<sup>17</sup> Miceli's argument concerning the two institutions is an application of the Coase theorem in that  $x^*$  always results. Yet, the theorem barely holds in reality, invalidating the indifference argument. As Coase (1993, pp. 250) himself emphasized, “law controls the economy” due to transaction costs.

example, the Kohler Act in *Pennsylvania Coal Co. v. Mahon et al.* [260 U.S. 393, 1922] (Miceli, 2012, pp.124-125). By default, it would be appropriate to compensate the plaintiff's "support estate" that was acquired legally. Courts can then attempt to find if there is any legitimate reason to exempt compensation such as substantial administrative costs or sufficient in-kind compensation to the plaintiff. Justice Holmes offered the well-known proposition that compensation is required when a regulation is "going too far." It is crucial to note that the case was concerned with the taking of the well-established property right that had been legally acquired by the Pennsylvania Coal through the voluntary contract with Mahon. We particularly emphasize that efficiency of the Kohler regulation *per se* was not the primary rationale behind the compensation decision. The ex-post rule was not applied, and was, in fact, simply irrelevant.

In *Nollan v. California Coastal Commission* [483 U.S. 825, 1987], the Supreme Court ruled that a requirement by the California Coastal Commission that Nollan should dedicate a lateral public easement to secure public access to the beach, was a taking violation of the Fifth Amendment. Note that the Court upheld just compensation *not* because the regulatory requirement was proven to be inefficient. The ruling obviously had no place for the ex-post rule suggested in Section II.<sup>18</sup> The case was about infringement on the property rights that had been well established.

Finally *Lucas v. South Carolina Coastal Council* [505 U.S. 1003, 1992], the Supreme Court held that a regulation constitutes a taking when it deprives an owner of *all* economically beneficial uses of land, with the exception that the prohibited use interests are initially not part of the property rights. Subsequently, it concluded that the ordinance obliterated the value of both Lucas' plots as building sites. We propose that the Coastal Council appeared to believe, at the time, that the regulation was efficient considering that it initially argued that it would promote tourism by controlling development and maintaining open spaces in their natural condition. Suppose that the argument by the Coastal Council was indeed verified as legitimate by an expert. Would this verification justify no compensation based on the ex-post rule in the economic model? Note, ironically, that this argument is exactly the same as the usual claim in

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<sup>18</sup> The ruling did not examine whether Nollan had been using the lot efficiently. Thus, the ex-ante rule also was not used for the decision to uphold compensation, which will be elaborated more below.

seeking a taking for a public use with just compensation. In conclusion, there was no room for the ex-post rule in *Lucas*. To summarize, the ex-post rule does not apply to the regulatory takings where the initial property rights are well recognized.

## **2) Inadequacy of the Ex-Ante Rule When Exercising Police Power**

Regulations to prevent air pollution, explosion, or noise always restrain the entitlements of the regulated to a certain degree. Nonetheless, the Court perceived the level of firmness in such entitlements to be nil or very low at the most. In other words, these regulations are tantamount to exercising police power. The relationship of *public use* of eminent domain to the *public purpose* of police power is the same as the relationship of *private necessity* to *self-defense* (Epstein, 1985, pp. 109-110). Furthermore, the exercise of police power is well justified when the state can act for the benefit of individuals who are unable to coordinate their activities to protect themselves (Epstein, 2008, p. 108).

The doctrine of nuisance exception has been most frequently used in regulatory takings disputes as a rationale underlying the police power. The U.S. Supreme Court first explored the intersection of the issues of takings and this doctrine in *Mugler v. Kansas* [123 U.S. 623, 1887]. It held that a state's regulation prohibiting the manufacture of intoxicating liquor does not infringe on any constitutional right, that the regulatory statute in question strictly belonged to the police power of the state, and that the regulation to protect the health and safety of the community cannot be deemed a taking. In the early 20th century, the Court, following *Mugler*, repeatedly upheld a variety of property rights claims in deference to the government's arguments that it was invoking its police power to address key public health, safety, and welfare concerns.<sup>19</sup>

However, a change in the judicial attitude of general deference to executive bodies was detected from the late 20th century. Let us examine one of the so-called *trilogy* of the nuisance exception cases at the Supreme Court spanning the late 1970s to the early 1990s (along with *Penn Central Transportation Co. v. New York City* [438 U.S. 104,

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<sup>19</sup> Representative cases include *Plymouth Coal Co. v. Pennsylvania* [232 U.S. 531, 1914] that dealt with miner safety regulation, *Hadacheck v. Sebastian* [239 U.S. 394, 1915] that stemmed from the closure of brickyard in urban area, *Reinman v. City of Little Rock* [237 U.S. 171, 1915] that involved the abatement of a livery stable operation in a residential neighborhood, and *Miller v. Schoene* [276 U.S. 272, 1928] that involved a government directive by Virginia to cut down infected red cedar trees.



1978] and *Lucas*). In *Keystone Bituminous Coal Association v. DeBenedictis* [480 U.S. 470, 1987], a Pennsylvania coal company again challenged a state regulation that requires coal companies to reserve certain underground coal deposits to provide support to the surface lands and prevent damaging subsidence. The case involved the same basic facts as those of *Pennsylvania Coal* of 1922 but produced an opposite ruling. This time, the Court relied on the nuisance exception. The majority argued that the regulation is consistent with the harm-prevention legislative justifications, which was not endorsed in *Pennsylvania Coal*.

Our thoughts on *Keystone* are two-fold in terms of using the two compensation rules of EDET. First, Miceli (2012, p. 133) highlights the efficiency of this regulation that has resulted over time, stating that “...the efficient threshold rule suggests that an inquiry into the relative benefits of the government’s action in the two cases is in fact crucial for deciding the compensation question.” He evaluates that, compared to *Pennsylvania Coal*, a change in circumstances under which the regulation became more efficient was reflected in *Keystone*. We agree that the regulation might have become more efficient. However, the Court did not endorse this regulation merely because it was efficient (i.e.,  $E > V(x)$ ). The main rationale was, unlike the argument of EDET, its belief that the regulation was an exercise of police power (i.e. the nuisance exception).<sup>20</sup>

Second, given that the Court endorsed the nuisance exception doctrine, the ex-ante rule of EDET would not even be an option for the Court to consider. The Court believed that the mining company, *Keystone*, had the right to mine only in a way that would not cause any subsidence. In other words, the majority viewed that *Keystone*’s legal right was not wrongfully restrained by the regulation. Also, the Court’s view can be interpreted as a constructive role that the regulation plays to correct this disequilibrium.

So far, we have shown through actual court cases that the ex-ante rule cannot be used provided a *police power* defense is accepted. In contrast to this reasoning, the ex-post rule is never relevant once a regulatory taking based on *public use* is acknowledged. In other words, this observation offers a critical implication. Faced with a certain dispute

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<sup>20</sup> Nevertheless, four Justices were still reluctant to acknowledging the nuisance exception. In fact, Chief Justice Rehnquist dissented, arguing that “our cases have never applied the nuisance exception to allow complete extinction of the value of a parcel of property.” (*Keystone*, pp. 512-513)

concerning regulatory takings, courts may not choose *any* rule they want *a priori*. In the end, the two rules are not indifferent.<sup>21</sup>

To summarize, the discussions in Section III.2 so far clearly suggest that the ex-post rule is irrelevant for regulatory takings that require compensation whereas the ex-ante rule is irrelevant for police-power regulations that, by default, do not require compensation. The two rules are far from being indifferent. We envision conceptually that the indifference would hold *only* when the right in question has a feature of “perfect reciprocity” *a la* Coase (1960) between people. *Bryant v. Lefever* [Chancery Appeal, 4 C.P.D. 172, 1879], as explained in Coase (1960, p. 12), might be an example. No party in this case had a clearly established right in advance: neither the right to enjoy air by the plaintiff nor the right to build higher by the defendant. In this situation, either rule can be used, since efficiency is the only criterion.<sup>22</sup>

## **IV. Discussion: Critique and Beyond<sup>23</sup>**

### **1. Limitation of EDET and Regulations in Reality**

We assess that, while the implication from EDET (or a big portion of the economic theory) is seemingly elegant in theory, it can easily be arrogant in practice. Considering the limitations of EDET to reflect the characteristics of regulation in reality, Kim and Lee (2017) suggested that the model should include the extended concept in performance criterion, the compensation scheme should not be all-or-nothing, and the behavioral adjustment after the regulation can be marginal.

Kim and Lee (2017), based on their synthesis work of two legal theories of

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<sup>21</sup> Note that the ex-post rule is not always the exact answer even if a police power defense is accepted, which is another shortcoming of EDET in explaining the real-world disputes. *Dolan v. City of Tigard* [512 U.S. 374, 1994] offers a good illustration on this account. Even if the *Dolan* case involved a police power regulation, the significant level of *disproportionality* would make the value of demoralization costs substantial. For more details of *Dolan* refer to Referee’s Appendix I.

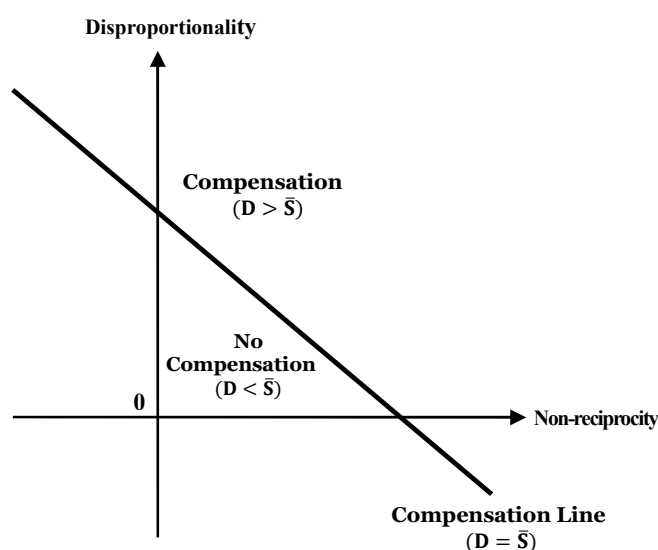
<sup>22</sup> Nevertheless, the so-called Coasian scrutiny (Coase, 1960) revealed that giving the defendant’s right to build higher appears to be superior. Epstein (1979), in particular, argued that the value of the right to build higher (within a limit) increases in a dynamic sense. The rationale for no compensation in this regulation usually does not lie in the exercise of police power.

<sup>23</sup> This section heavily builds on Kim and Lee (2017).

Michelman (1967) and Epstein (1985), argue that we should explicitly adopt an *extended concept of efficiency* that embraces particularly demoralization costs (D) of Michelman. Provided that a decision of no compensation *universally and systematically* exerts resistance and unrest, these psychic costs, D, should be counted in utilitarian calculus for measuring *social welfare*.<sup>24</sup> The authors subsequently provide a compensation formula for regulatory takings that can offer more reasonable prescriptions. We summarize their formula very briefly below.

Kim and Lee first observe that the pre-existing demoralization costs tend to be reduced if “*the state’s regulatory taking activity based on police power restores the property right that was wrongfully infringed*” because the activity can be considered as a “*re-taking of the wrongfully taken property in the past.*” In this sense, the authors argue that D from the current regulation, which is included in the utilitarian calculus of performance criteria, can take from a negative to (small) positive value.

**Figure 1. Compensation Line: Comparison of D and S**



Source: Kim and Lee (2017)

In fact, Kim and Lee (2017, Sections III and IV) elaborate that D, in general, is affected by two major elements as long as the regulation meets the public interest

<sup>24</sup> In this regard, Michelman’s calculus may be an example that is consistent with the ‘welfare-based normative approach’ advocated by Kaplow and Shavell (2002, p. 3).

criteria. Firstly, D increases as the (intra-personal) “*disproportionality in terms of the costs and benefits of the regulation increases to the regulated.*” Secondly, the cost increases as “*the restrained right of the regulated has been more firmly established.*” After D is investigated, Michelam’s formula is applied.

According to Michelman’s formula, compensation should be made if D exceeds settlement costs (S),<sup>25</sup> and no compensation is a superior option otherwise, as long as a regulatory taking is justified.<sup>26</sup> The compensation decision can further be illustrated by the *compensation line* as depicted in Figure 1. No compensation to the regulated is justified if a regulation is located below the compensation line, and the regulated should be compensated otherwise. Therefore, it becomes more justifiable to compensate the regulated as a regulation harms more established rights and more disproportionately.

## 2. Six-step Scrutiny: A Suggestion

Kim and Lee (2017, Sections V and VI) now formally explore a compensation rule for regulatory takings that better reflects the reality. Specifically, their theoretical conjectures can be summarized as *six-step scrutiny*. As the most distinct feature of the scrutiny, the *extended concept of efficiency* is utilized for the ultimate performance criterion, based mainly on the synthesis of Michelman and Epstein. The six-step scrutiny is described as follows.

**Step 1** identifies two groups of people. P1 refers to the group of people who gain from the regulation, whereas P2 refers to the group of people who bear losses. **Step 2** examines whether the regulation meets the standards of public interest (i.e., publicness and the Kaldor-Hicks efficiency). **Step 3** examines how wrongful the act by P2 was *prior to* the introduction of the regulation. **Step 4** attempts to measure disproportionality as conceived by P2, by balancing the losses against in-kind compensation. **Step 5** determines whether compensation should be required through the results from **Steps 3**

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<sup>25</sup> Michelman (1967, p. 1214) defines settlement cost as “*the dollar value of the time, effort, and resources which would be required in order to reach compensation settlements adequate to avoid demoralization costs.*”

<sup>26</sup> Certainly, the regulatory taking is not justified if the net benefits of the regulatory taking are smaller than the smaller one of D and S.

and **4. Step 6** conducts the final scrutiny on the legitimacy of the regulation based on the *extended concept of efficiency* that utilizes the Michelman rule.<sup>27</sup> Thus, the position of *Lucas*, for example, is located well above the Compensation Line in Figure 1.<sup>28</sup>

## V. Conclusion

In this paper, we reviewed the backbone of the efficiency-dominating economic theory (EDET) and related limitations in applying it to the real world cases. Our critique is, at least, five-fold. First, technically speaking, EDET not only adopts key assumptions that cannot be fulfilled easily, but also the merit of the investment-invariant compensation is not properly emphasized. Second, EDET departs from the reality that regulatory takings are mostly act-based rather than harm-based, and has a very peculiar setting in which all investment becomes sunk with the introduction of a regulation. Third, it has been claimed that one of the major contributions of EDET is the proof of indifference between the ex-ante and ex-post rules in terms of deriving efficient equilibrium. However, such mathematical indifference was obtained only at the expense of not reflecting the critical facets of regulatory actuality such as determining the causes of the problem or who will be the distinct losers with high demoralization costs. Fourth and closely related to the third criticism, EDET seems to imply that either rule can be used equally well. However, this implication keeps EDET completely at a distance of legal practices. Fifth, efficiency, albeit its importance, is clearly inadequate to be used as the only basis for decisions with regard to whether to compensate or not.

In an attempt to overcome these shortcomings, we briefly discussed, based on the recent work of Kim and Lee (2017), the six-step scrutiny where an extended concept of efficiency is utilized. The extended concept includes, among others, the level of fairness to be used in utilitarian calculus for determining whether to compensate or whether to

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<sup>27</sup> The authors highlight the contribution of **Step 6** especially when a regulation is based on police power. For example, even if the Kaldor-Hicks efficiency is found to fail to be met in **Step 2**, the regulation can be justified in **Step 6** in the presence of a strong police-power rationale. Or, even if a compensation decision is made in **Step 5** for a public-use regulation, the regulation should be repealed when the magnitude of S is found to be prohibitively high enough to offset its net benefit.

<sup>28</sup> Refer to Referee's Appendix II for more detailed explanations.

maintain the regulation. This framework appears to be workable, more accurate in diagnosis, and also consistent with critical doctrines that courts have appreciated. Therefore, such scrutiny can become a good alternative, based on economic reasoning, to EDET in tackling the compensation questions of regulatory takings.

## **Referee's Appendix I: Inadequacy of EDET in Explaining Police Power Regulation**

In *Dolan*, the City of Tigard notified that it would issue a permit to expand Dolan's existing structure on the condition that 10% of Dolan's land is dedicated to build a bicycle path to relieve increasing road congestions. In *Dolan*, Justice Rehnquist emphasized a two-prong test. The first condition is an "essential nexus" between a legitimate state interest and the regulatory condition that was imposed to the regulated. Its second condition concerns whether there is a "rough proportionality" between risks potentially generated by the regulated party and the specific threat directed by the government. Otherwise, the government requirement would be regarded as an "unconstitutional coercion."

The majority opinion held that the first condition was satisfied. However, on the rough proportionality count, the Court held that the requirement for a public greenway was excessive burden to Dolan, declaring that "*a government agency may not require a person to surrender constitutional rights*" (*Dolan*, 385). Thus, in spite of the Court's *alleged* endorsement of efficiency in "converting the use of land for the proposed bicycle path," compensation is still warranted when the degree of the exaction is excessive. That corresponds to expropriating a well-established property right. In this regard, the ex-post rule of EDET is incomplete in explaining the reality.

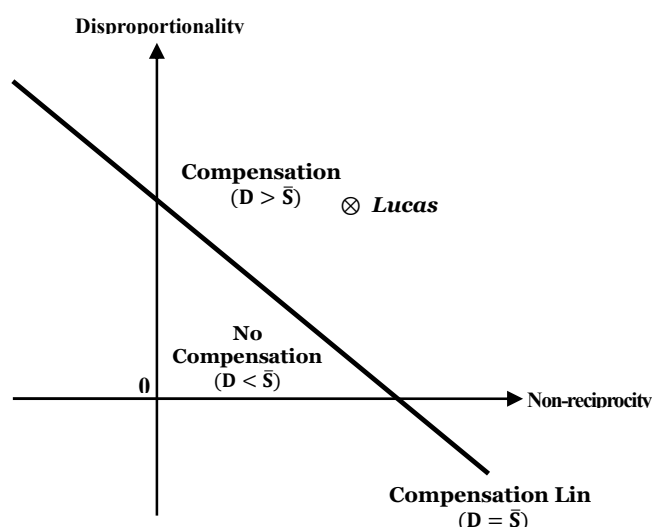
This illustration of *Dolan* implies that the discussions of the disproportionality of Michelman (1967) and Epstein (1985) still apply in the case of police power. In the similar vein, the procedural setting of EDET that sinks all investments when  $E > V(x)$  is also related to the disproportionality issue. Therefore, police power, in practice, can step in even when  $E < V(x)$  and regulatory methods exist that internalize the wrongdoer's activity without having sunk all investments made. Regardless, these regulations can effectively lower the demoralization costs that have been present.

## **Referee's Appendix II: Six-step Scrutiny on the *Lucas* Case**

**Step 1** identifies that P1 is the group of beachgoers at the South Carolina coast, whereas P2 includes those who intend to build or renew houses. Through **Step 2**, we confirm that the public-interest condition is also met. P1 includes not only daily beachgoers but

also travelers, and the benefits appear to exceed the pecuniary losses to landowners. We infer in **Step 3** that building houses on empty beach front parcels would not hamper scenic views or increase the safety risk. Rather, such act of P2 is a legitimate use right, making the degree of non-reciprocity decisively positive. **Step 4** readily demonstrates that the value of disproportionality was positive and of a significant scale. In **Step 5**, considering the results of **Steps 3** and **4**, it is tentatively concluded that compensation is necessary. The correct amount of compensation is equal to the entire losses incurred to P2. In **Step 6**, we confirm that, with a small size of settlement costs, the decision of compensation is finally held. Therefore, we conclude that the position of *Lucas* is well above the Compensation Line as in Figure A1.

**Figure A1. Positioning the *Lucas* Case**



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