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The Economics of Necessity

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ABSTRACT

The necessity doctrine aligns the private incentive and the social incentive for a property possessor to take a defensive action that prevents an invasion of his or her property from occurring. The model described here is also applicable to self-help in contracts.

INTRODUCTION

The famous American necessity cases, *Ploof v. Putnam* (71 A. 188 [Vt. 1908]) and *Vincent v. Lake Erie Transportation Co.* (124 N.W. 221 [Minn. 1910]), present something of a puzzle to readers the first time around. In both cases, the invading party ties a boat—a sloop in *Ploof,* a steamship in *Vincent*—to the dock of the property possessor in order to avoid damage during a storm. In *Ploof,* the property owner untied the sloop from the dock, and it was destroyed from the force of the storm driving it against the shore. In *Vincent,* the steamship crew maintained the vessel fast against the dock during the storm and damaged the dock. The property owner was found liable to the sloop owner in *Ploof,* and the steamship owner was found liable to the dock owner in *Vincent*.

The lesson from these cases is that under the necessity doctrine, the invading party is not technically a trespasser as long as his or her entry

is excused under necessity.[1] But the invading party is liable for the damage done by that invasion to the possessor's property.

The question this raises is, what purpose does the necessity doctrine serve? The value of not being labeled a trespasser does not appear to be great, to the invader, if he or she is still strictly liable for the damage to the possessor's property. The answer to this puzzle is that the necessity rule affects the possessor's incentive to use force to expel the invader from the property. Since the invader is not a trespasser under the law, the possessor may be held liable for harm done to the invader, even when the possessor uses reasonable force to expel the invader.

This outcome suggests that the function of the necessity doctrine is to regulate the incentives of the property possessor. In this paper, I offer a simple positive theory of necessity: the doctrine aligns the private incentive and the social incentive for a property possessor to take a defensive action that prevents an invasion from occurring. In the absence of the necessity doctrine, property possessors would take defensive actions too frequently.

The model below describes the private and social incentives for defensive conduct in response to property invasions.[2] The key results of the model can be explained by considering, first, a setting in which litigation costs are zero. If litigation costs are zero, an invasion will occur, given trespass liability, only when the invader's gain is greater than the possessor's loss. Since the gain from invasion is greater than the loss, there is no social interest in having defensive actions occur, as long as the cost of defense is positive; and since the victim is compensated for the loss from the invasion, he or she will never have an incentive to take a costly defensive action. Thus, in the zero-litigation-cost setting, there is no divergence between the private incentive and the social incentive for defense. There is also no need for a necessity rule at all, since defensive actions will not be observed.[3]

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1. I am focusing on private necessity rather than public necessity. Private necessity typically involves a choice between harm to the invader and harm to the property owner. Public necessity involves a choice between harm to some specific victim and harm to a larger group of victims.

2. The general conclusion that the private necessity doctrine is optimal is consistent with the discussion in Posner (1998, p. 191). However, Posner employs reasoning based on an analogy with the Hand formula to justify the necessity doctrine. This paper, in contrast, sets out a simple model of the private and social incentives for defense of property.

3. Rizzo (1980, p. 316) notes, as a puzzle, that property owners should have no incentive to defend given that they will be compensated in a tort action. Making sense of private necessity begins with an effort to explain the incentives for defensive conduct. The presence of positive litigation costs provides one explanation for the incentive to defend.

Now suppose litigation costs are positive. In general, costly defensive action may be socially desirable because it avoids expensive litigation or prevents a wealth-reducing transfer of property. However, since a rational invasion will occur only when the invader's gain is greater than the possessor's loss, costly defensive action may or may not enhance society's wealth. But the possessor will always choose to defend when he or she can avoid personal litigation costs, so this implies an excessive incentive to defend. Hence, with costly litigation, and in the absence of the necessity rule, possessors will defend too frequently from society's perspective.

The necessity doctrine enhances social welfare because it aligns private and social incentives to defend in the presence of litigation costs. I consider two scenarios: one in which the cost of defense is positive and another in which the cost of defense is negative. When the cost of defense is positive, defensive conduct is never socially desirable in response to a rational invasion. The liability of possessors to invaders imposed under the necessity rule removes the incentive to take costly defensive action in this scenario. In the more general setting in which the cost of defense may be negative, the necessity rule does not completely eliminate the incentive to take defensive action, but it optimally aligns private and social incentives for defense.

Although I focus on property invasion, the analysis of defensive conduct in this paper can easily be applied to other settings, notably, self-help in contract disputes. Consider the case in which the buyer refuses to accept the tender of some contracted-for item (for example, a newly constructed house) because he or she perceives features in the item that are inconsistent with the terms of the contract (Posner 1998, p. 148). The problem of aligning private and social incentives for self-help is similar in many respects to the defense-of-property issue studied here.[4]

1. THE CONTEXT OF NECESSITY

Ploof and *Vincent* involve storms, but the general pattern is one of an actor trying to avoid some injury to person or property from a condition that has arisen without the fault of the actor. In *Rossi v. DelDuca* (181

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4. On the law of self-help in contracts, see *Jacob & Youngs, Inc. v. Kent* (230 N.Y. 239, 129 N.E. 889 [1921]) and Ben-Shahar and Posner (2011).

N.E.2d 591 [Mass. 1962]),[5] the plaintiff invaded the defendant's property while running away from a dog. The necessity rule provides an excuse for the actor's invasion. Although most necessity cases involve an invasion to real property, there appears to be no reason to limit the necessity rule to real property invasions (Bohlen 1926, p. 319). Suppose, for example, an actor takes a car in order to escape a ferocious animal and damages the car while driving it. There is no obvious reason that this case should be treated differently from *Vincent*.[6]

One feature that is observed in all necessity cases is high transaction costs. The invasion occurs in a setting in which it would be impossible for the invader and the possessor to bargain, before the invasion, over the terms on which the invader would be permitted to enter the land. The cases involve scenarios that are described as emergencies, in the sense that the actor contemplating the invasion must act immediately or suffer some substantial loss.

Although all of the cases involve an invasion committed for the purpose of protecting an interest that is greater in value than the loss that the invasion causes, that is not a sufficient condition for the necessity defense. If an invader crosses the possessor's land for the sole purpose of saving the expense of using some alternative path, that conduct may not be deemed worthy of the necessity defense. For example, in *Jacque v. Steenberg Homes* (563 N.W.2d 154 [Wis. 1997]),[7] the defendant crossed the plaintiff's property after the plaintiff had refused an earlier request by the defendant to cut through his land in order to deliver a mobile home to a customer. Without access to the plaintiff's land, the defendant would have had to take a winding, narrow road that was covered in parts with up to 7 feet of snow. The gain to the invader was unambiguously greater than the loss to the possessor. However, the court did not find (or even consider) a necessity justification, and that outcome

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5. The plaintiff, a child, ran onto the defendant's property in an attempt to escape a dog and while on the defendant's property was attacked by the defendant's dogs. The defendant argued that he was not liable because the plaintiff was a trespasser.

6. There may be valuation issues that distinguish personal property invasions from real property invasions. However, for many types of personal property, there are thick markets in secondary trade. In the presence of such markets, it should not be difficult to assess damages caused by an invasion. Whenever the personal property is not traded in a thick market and is otherwise difficult to appraise, the invasion of personal property may present issues not typically presented in the cases of real property invasions. Whenever the invasion is to the person, rather than to personal property, the valuation issues become more troubling (see Bohlen 1926, p. 323).

7. The necessity defense was not raised in *Jacque*.

is consistent with the necessity case law. *Jacque* did not involve a high-transaction-cost setting. Steenberg Homes could have continued to bargain with Jacque, or it could have bargained with its own customer to find an alternative to cutting through Jacque's property without permission.[8]

In contrast, even if transaction costs are high, it appears that the defense also requires that the gain to the invader be greater than the loss to the possessor. The final sentence of *Vincent* appears to limit the necessity defense to instances in which the invader is protecting an interest that is more valuable than that of the possessor.[9] Influenced by this language in *Vincent,* Bohlen (1926, pp. 314–15) argued that this is indeed a requirement of the necessity defense.

From the perspective of the invader, it is not of great consequence whether the law requires the gain to the invader to be greater than the loss to the possessor. Given trespass liability, an actor will not invade, at least not rationally, if the gain from an invasion is less than the loss it would impose on the possessor.

Another feature of necessity cases, reflected in varying degrees, is that of rational intentional action of the sort required by the trespass doctrine, as opposed to instinctive action. The invasion in *Vincent* resulted from an effort to save property and involved sufficient time for the boat owner to calculate whether loss of the ship was more costly than damage to the dock. However, an invader who jumps a fence to avoid a ferocious animal may not satisfy the intentionality requirement of trespass doctrine. Similarly, a possessor who takes a defensive action to save his or her life under emergency conditions may not be liable to victims. In *Cordas v. Peerless Transportation Co.* (27 N.Y.S.2d 198 [N.Y. City Ct. 1941]), a taxi driver jumped from his car while it was running in order to escape a gunman who had boarded it. The car continued, out of control, injuring a woman and her two children. The taxi company was not held liable for its driver's actions. The driver's defensive conduct risked injury to the gunman and to others, but it was not unreasonable

8. A similar and perhaps more appropriate case is *Southwark London Borough Council v. Williams* ([1971] Ch. 734 [C.A. 1970]). Homeless people invaded and squatted in the plaintiff's housing and argued that they should be permitted to stay on the basis of the necessity doctrine. The court rejected the argument because the defendants could enter the London housing market and purchase suitable housing at relatively low transaction costs.

9. The case is described as one in which "the defendant prudently and advisedly availed itself of the plaintiffs' property for the purpose of preserving its own more valuable property" (*Vincent,* 124 N.W. 222).

according to the court because of the nature of the threat and the emergency conditions.[10]

   Vincent remains controversial because of its holding that an invader whose actions qualify for the necessity defense will still be liable for the harm caused by that invasion.[11] But this holding should be understood in light of the rational nature of the invasion—the fact that it was a case of property against property and that there was time to calculate the costs of alternative courses of action.[12] Had these features not been part of the case, the invasion may have been deemed reasonable under the circumstances. The economic analysis below assumes the conditions of a rational invasion of the type in *Vincent*.

2. MODEL

There are two actors, the possessor and the invader. The possessor owns property that the invader wants to use or to take. Transaction costs are high, so the invader cannot bargain with the possessor for access to the property. The invader's choice is to take or not to take. If the invader chooses to take, he or she will impose a loss on the possessor.

   For example, suppose the possessor owns a dock and the invader wants to moor his or her boat to the possessor's dock during a storm. Because the storm is worsening rapidly, there is no time for the invader to bargain for permission from the possessor. If the invader moors the boat successfully, he or she avoids the losses that might otherwise have resulted if caught out on the waves in the storm. However, when the invader's boat is moored to the possessor's dock, it is likely to damage

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   10. *Laidlaw v. Sage* (52 N.E. 679 [N.Y. 1899]) is a case with similar reasoning. The robber baron Russell Sage was approached in his office by a suicide bomber with a demand for money. Sage avoided injury by moving his clerk, Laidlaw, between himself and the terrorist. One ground for finding that Sage was not liable to Laidlaw was that his conduct was not the sort of rational calculation required under the law of intentional torts. Perhaps the most famous case of this type is *Scott v. Shepherd* (96 Eng. Rep. 525 [K.B. 1773]). Shepherd threw a lighted squib into a market stall, and the squib was thrown by two intermediate actors before it exploded, putting out one of Scott's eyes. The court found that the actions of the intermediate actors were not independent trespasses, because they were motivated by a "compulsive necessity" to avoid injury.

   11. For a recent presentation of the controversy, see Sugarman (2005).

   12. To be clear, the necessity defense definitely applies to life versus property trade-offs—for example, when someone runs onto another person's property in order to avoid a threat to life or health (see, for example, *Rossi v. DelDuca*). But some cases in which life is at stake may also involve reflexive action that falls below the level of intent typically required by trespass law.

the dock as wind and waves from the storm ram the boat against the dock.

The possessor observes the invader's decision and can choose to take a defensive action that prevents the taking. Alternatively, the possessor can allow the taking to occur and then sue the invader for damages. The possessor's decision will be based on a comparison of the costs and benefits of the alternatives. I use the following terms:

c_p = the possessor's cost of litigation, $c_p > 0$;
c_d = the invader's cost of litigation, $c_d > 0$;
l = the loss to the possessor from a taking, $l > 0$;
g = the gain to the invader from a taking, $g > 0$; and
a = the cost to the possessor of a defensive action.

I assume that it is cheaper for the possessor to use a defensive action than it is to litigate; therefore, $a < c_p$. This could be true for many reasons. It could be that litigation is extremely costly. Alternatively, it could be that the damage award provided by the court does not fully compensate for the loss suffered by the possessor as a consequence of the taking (to remain within this framework, I would redefine the cost of litigation to include losses uncompensated in court). For example, if there are subjective components of the loss suffered by the possessor from an invasion, the compensation provided by the court will fall short of full compensation.

I do not assume that the cost of defense is necessarily positive. It is likely to be positive as a general matter; for this reason I treat $a > 0$ as the default assumption. However, I allow for the possibility that $a < 0$. The overall cost of defense could be negative if the defensive action has a future payoff that exceeds the immediate short-run cost of taking the action. For example, taking a defensive action could establish a reputation for stinginess or for retaliation that deters future invasions. In this case, the present value of the stream of payoffs associated with a particular defensive action could easily be positive (which means that the cost of defense is negative). In contrast, taking a defensive action could spur future rounds of retaliation that drive the cost of defense toward infinity (Parisi 2001).

Admittedly, this situation raises the question of whether the private costs and the social costs of defense differ. To simplify, I will assume initially that the variable a captures both the private costs and the social costs of defense. In general, this total is likely to be positive. However, even from society's perspective, the cost of a defensive action could be

negative. For example, a defensive action, by establishing a reputation for territoriality, could deter predatory behavior by foreign invaders.

2.1. Zero-Litigation-Cost Case

To clarify the model's presentation, I first consider the case in which litigation costs are zero. Considering the zero-litigation-cost case initially will make it easier to understand precisely how litigation costs matter in understanding the incentive effects of the necessity doctrine.

The invader first chooses whether or not to attempt to take a property interest of the possessor (for example, to moor a boat to the possessor's dock). Since the invader will be held liable under trespass law for the loss suffered by the possessor as a result of the invasion, the invader will take if and only if $g > l$.

In response, the possessor will choose whether to take a defensive action. If the possessor takes a defensive action, the invader will be thwarted and will therefore forgo the gain, g. It follows that defense is socially desirable if the sum of the cost of defense and the forgone gain from invasion is less than the harm that results from the invasion:

$$a + g < l. \tag{1}$$

Thus, if the cost of defense is positive, defensive conduct is never socially desirable in response to a rational invasion.

Will the possessor act in defense even when the cost of defense is positive? Since the possessor will be compensated for the loss, l, under trespass law, he or she will not suffer any harm from the invasion.[13] Thus, the possessor will not have an incentive to act in defense, since that would involve taking a costly action to avoid a loss of zero. It follows that if litigation costs are zero, then in the default setting in which the cost of defense is positive, the private and social incentives to act in defense are aligned.

Now suppose that the cost of defense is negative. This may be so because there is a positive future payoff from taking the defensive action that exceeds the immediate cost. In this case, the social desirability of

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13. I assume that the court provides full compensation. If the court provides less than full compensation—say, because there is a subjective component of loss that cannot be observed—then the possessor clearly will suffer some harm even with compensation taken into account. This concern is effectively addressed by the positive-litigation-costs case examined in the remainder of the paper. In the positive-litigation-cost setting, compensation provided by the court fails to fully relieve the plaintiff of the harm suffered from the invasion. Thus, the positive-litigation-costs case can be considered equivalent to the zero-litigation-costs case with courts providing less than full compensation.

defense is still governed by equation (1). However, the possessor will always have an incentive to take the defensive action, given that $a < 0$. Socially undesirable defensive conduct can occur, specifically when the cost of defense is less than the loss/gain differential $(l - g)$. Suppose, for example, that the possessor's loss from invasion is \$10 and the invader's gain is \$100. If an act of defense has a short-run cost of \$20 but brings an expected payoff of \$40, the cost of defense would be $-\$20$, and the possessor would choose defense even though it is not socially desirable.

2.2. Positive-Litigation-Costs Case

In this section, I consider the far more realistic scenario in which litigation costs are positive. I show that in the default setting of positive defense costs, the private and social incentives to act in defense are not aligned. I then examine the function that the necessity doctrine plays in aligning the private and social incentives to take defensive action.

2.2.1. Trespass Law without the Necessity Rule.
First, consider what happens in the absence of the necessity doctrine. The invader will be held liable for trespass if he or she chooses to take the possessor's property, provided the possessor brings a lawsuit. Since I assume that the possessor's loss is greater than the litigation cost, that is, $l > c_p$, the possessor will bring a lawsuit. Given this scenario, the invader will rationally take if and only if his or her gain exceeds the expected liability,

$$g > l + c_d, \tag{2}$$

because if the invader takes, he or she will get the gain but will also have to pay for the loss to the possessor and the personal litigation expense.

In response to an attempted invasion, the possessor can choose to defend or to forgo defense and litigate for damages after the invasion. From a social perspective, defensive action is preferable to litigation if

$$a + g < l + c_p + c_d, \tag{3}$$

which means that the sum of the cost of the defensive action and the gain to the invader is less than the sum of the loss to the possessor and the total litigation cost. Alternatively, the defensive action is socially desirable when

$$a - (c_p + c_d) + (g - l) < 0. \tag{4}$$

Thus, in the absence of the necessity rule, defense could be socially desirable when (1) the cost of the defensive action is less than the total

cost of litigation or (2) the gain to the invader is less than the loss to the possessor. Welfare-enhancing defense either substitutes toward a cheaper method of terminating a dispute (no invasion, no dispute) or prevents a transfer of property that would have reduced society's wealth.

Given that a rational invasion implies that the invader's gain is greater than the possessor's loss, the defensive action will be socially desirable, in the absence of the necessity rule, if it is so much cheaper than litigation that it outweighs the welfare loss from preventing the wealth-enhancing transfer.[14] Thus, unlike the zero-litigation-cost case examined earlier, defensive action could be socially desirable even when the cost of defense is positive.[15]

From the private perspective of the possessor, the defensive action is preferable to litigation as long as

$$a < c_p, \tag{5}$$

which is assumed to hold. If the possessor takes a defensive action, there will be no invasion; hence, the only cost incurred by the possessor when he or she takes a defensive action is a. If the possessor chooses the option of no defense plus litigation, he or she will be compensated for the loss from the taking but will still bear the cost of litigation.[16] It follows, then, that the possessor will choose defense over litigation.

Since the possessor will always choose the defensive action, there is a conflict between the private incentive and the social incentive for defense. From a social perspective, the defensive action should be taken when and only when equation (4) holds. From the private perspective

14. Put another way, since $g - l - c_d > 0$, given a rational invasion, defense is socially desirable if the savings to the possessor from choosing defense instead of litigation, $c_p - a$, is greater than the invader's net gain, $g - l - c_d$.

15. This model does not incorporate settlement. If settlement were incorporated, then the cost of litigation would obviously be less, and it would be less likely that defensive action could be socially desirable. Still, dispute resolution through settlement or litigation involves time and delay, while defensive conduct operates immediately. Given this reality, it is unlikely that the argument here would change if the model incorporated settlement of litigation.

16. The conditions described here would change in form if I assumed a different allocation rule for litigation costs, such as the English rule. However, what is important in this analysis is that the possessor bears some cost that will not be compensated fully in court. As long as the litigation process fails to fully compensate the possessor for every loss he or she suffers from the taking, there will be some cost suffered by the possessor in the event that he or she chooses to litigate. If c_p is interpreted broadly to capture nonreimbursable litigation expenses (for example, time spent with an attorney or finding an attorney or a court delay) or nonreimbursable elements of loss, then the relative cost efficiency of defense in comparison to litigation is likely to hold true irrespective of the litigation cost allocation rule.

of the possessor, the defensive action will always be taken because it is a cheaper form of dispute termination. Why spend \$2 in court when you can spend \$1 in preventing the property invasion up front?

2.2.2. Trespass Law with the Necessity Rule. Now consider the impact of the necessity doctrine. If the invader's gain exceeds the expected liability ($g > l + c_d$), the invader will intrude on the possessor's property. Under the necessity doctrine, the possessor will be liable to the invader for the harm suffered by the invader as a result of the possessor's defensive action.

First, consider the social perspective on defense, under the necessity doctrine. If the possessor defends, he or she will now be required to compensate the invader as a result of litigation.[17] The social cost of the defensive action is therefore $a + g + c_d + c_p$. The social cost of not defending (and litigating) is $l + c_p + c_d$. Defense is therefore socially preferable to nondefense if $a + g + c_p + c_d < l + c_p + c_d$, or

$$a + g < l, \tag{6}$$

which is the same as the social desirability condition in the zero-litigation-cost case. Thus, under the necessity doctrine, as long as the cost of a defensive action is positive, the defensive action will not be socially desirable in any instance of a rational invasion.

Now consider the private incentive to defend under the necessity rule. If the possessor defends, he or she will incur the defense cost, a, and liability to the invader as well. If the court takes factual causation into account in assessing damages, that liability amount will be the difference between the invader's gain and the possessor's loss, $g − l$. Obviously, the possessor will be liable for g. But if the possessor did not defend, he or she would have received l from the invader. The real level of damages to the invader is therefore $g − l$. Thus, for the possessor, defense is privately preferable to nondefense if $a + (g − l) + c_p < c_p$ or, equivalently, $a + g < l$, which is the condition under which defense is socially preferable. Thus, if courts assess damages accurately, the necessity rule aligns private and social incentives to defend property.

Even if courts do not assess damages accurately (that is, by taking factual causation into account), the necessity rule still generally aligns private and social incentives to take defensive action. In the setting in

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17. Given a rational invasion (one that satisfies equation [2]), the invader clearly will have an incentive to bring suit for damages equal to g against the possessor who took the defensive action. Since a rational invasion implies that $g − l − c_d > 0$, it follows that $g − c_d > 0$, so that the thwarted invader will bring suit.

which there is no necessity rule, the possessor always takes the defensive action, even though it is an inefficient response to a rational invasion ($g > l$). With the necessity rule (even if the court ignores causation in assessing damages), the possessor's incentive to take the defensive action becomes nearly equivalent to the socially optimal incentive. To see this, suppose the court awards damages to the invader equal to g (instead of $g - l$). The possessor would choose defense only when $a + g < 0$ and, therefore, would never choose defense when the cost of defense is positive or for a range of negative values as well ($a < -g$). This would be the efficient outcome in response to a rational invasion. Indeed, the possessor's incentives would be distorted only for values of a greater than $-g$ and less than $l - g$ (which would require, perhaps implausibly, the benefit of defense to be greater than the value of the property interest to be protected). When the invasion is not a rational one ($g < l$), application of the necessity rule could distort the incentive to take defensive action away from the social interest when courts do not take factual causation into account. However, as I noted in Section 1, the necessity defense does not apply to the invader when his or her gain is less than the possessor's loss (*Vincent,* 124 N.W. 222; Bohlen 1926, pp. 314–15). Given this scenario, the invader would be deemed a trespasser by the court, so the possessor would owe the invader no damages for the harm caused by his or her defensive action. The social incentive for defensive action in the absence of the necessity rule is given by equation (4). Since it is assumed that equation (5) holds, equation (4) will also be satisfied when the invader's gain is less than the possessor's loss. Thus, the incentive to take defensive action remains optimal. It follows that the doctrine of necessity equates the private and social incentives for a property possessor to take a defensive action that prevents an invasion of that property.

This analysis suggests that the conclusion that the necessity rule effectively equates private and social incentives for defensive action is robust to mistakes in the calculation of damages. Indeed, the implication in *Vincent* that the necessity rule applies only when the invader's gain exceeds the possessor's loss helps to make the necessity doctrine a robust solution to the problem of incentive divergence. As long as the court is accurate in determining the direction of the inequality between the invader's gain and the possessor's loss, mistakes in the calculation of either amount have no material effect on incentives.

I assumed at the outset that the possessor would sue for damages because his or her loss is greater than the cost of litigation ($l > c_p$). Given

that the possessor will sue, a rational invasion is one in which the gain to the invader exceeds the possessor's loss. Suppose, however, that the possessor's loss is less than the litigation cost ($l < c_p$), so that no possessor sues for damages after an invasion. Now all invaders will enter regardless of whether their gain from invasion is greater than the possessor's loss. In the absence of the necessity rule, the possessor would choose to defend if his or her cost of defense is less than the loss, $a < l$. This is inefficient, in some instances, because defense is socially desirable only when $a + g < l$. In other words, there are instances in which the possessor chooses to defend even though it is not socially desirable. In particular, the defensive action should not be taken when its cost is positive and the invasion is a rational one. If the necessity rule is adopted, the possessor will not take the defensive action in this case. If the cost of defense is negative (and the invasion is rational), the excessive incentive to act in defense will be replaced by an insufficient incentive to act in defense, but the distortion disappears as the total cost of litigation declines.

There is an additional complication in the scenario in which possessors do not sue ($l < c_p$). Recall that if an invasion occurs when the gain to the invader is less than the loss to the possessor, the necessity rule (probably) does not apply. If the necessity rule does not apply, the possessor will always choose to defend in this scenario when the cost of the defensive action is less than the loss to the possessor ($a < l$). Defense will be chosen too often in this scenario, but the necessity doctrine has no effect here since it does not apply.

3. SOME OTHER CONSIDERATIONS

3.1. Third-Party Victims

The necessity rule may not be optimal when there are third-party victims. First, consider the case in which the possessor's defense merely deflects the invader to another property owner. Return to the scenario in which the invader is piloting a boat toward the dock of the possessor in search of temporary mooring during the storm. The possessor blocks the invader from docking his or her boat. The invader pilots the boat to the dock next door and moors it there successfully. The first possessor blocks the invasion, and the second possessor suffers the invasion as a result.

Let the loss to the second possessor from an invasion be l_2. Defense

would be socially desirable if $a + l_2 < l$.[18] If the second possessor's loss is greater than or equal to the first possessor's ($l_2 \geq l$), defense would be socially desirable only if the cost of defense is negative. If the cost of defense is positive, defense would not be socially desirable. If the second possessor's loss is less than the first possessor's, defense could be socially desirable because it deflects the invasion to a possessor whose injury is less serious.

The necessity rule may or may not move the private defense incentive closer to the socially optimal incentive. In the case in which the second possessor's loss is greater than or equal to the first possessor's, and the cost of defense is positive, the necessity doctrine will move the private incentive closer to the social incentive. If the possessor believes that he or she will be held liable for the invader's loss (because he or she is unaware that the invader will invade the second possessor's property), under the necessity rule, the possessor will never choose defense in this scenario, and that is the socially correct decision. If the second possessor's loss is less than the first possessor's, or if the defense cost is negative, the necessity rule may not improve private incentives for defensive action.

A variation on the deflection problem arises when there are many potential victims of either the invasion or the defensive action. Suppose the invader approaches the possessor's dock during a storm in a boat holding diseased cattle. The invader's boat contains a lifeboat, so if the possessor refuses to allow the invader to moor, the invader will be able to survive in the lifeboat, while the diseased cattle perish at sea. If the possessor allows the invader to moor, the invader's boat will damage the dock, and that is the only loss that will be suffered by the possessor because he or she does not own cattle. However, if the invader unloads the cattle, they will spread disease to other cattle and thereby harm ranchers in the community. If, consistent with the incentives created by the necessity rule, the possessor focuses on the harm to his or her dock and the harm to the invader (loss of cattle), he or she may choose to permit the invader to moor. But the costs to neighboring cattle ranchers could far exceed the loss to the possessor. The necessity rule does not necessarily lead to the socially desirable outcome in this scenario.

The cattle hypothetical has the following structure: there are n potential victims, all suffering the same loss; the private harm from the

18. This equation is valid with positive litigation costs as long as the costs are the same whether the first or the second possessor sues.

invasion is *l;* and the social harm from the invasion is *nl.* Defense is socially desirable if $a + g < nl,$ and this equation is obviously more likely to hold as the number of victims increases. Flipping the property right under the necessity rule does not necessarily move incentives toward the social optimum. The necessity rule should be replaced, as it is under the public necessity doctrine, with a general reasonableness inquiry.[19]

Another variation involves the invader taking the defensive action. Suppose A knows that a bomb has been planted in B's car, which is located on B's property. He or she also knows that B intends to drive the car to Times Square in New York to set off the bomb. He invades B's property to explode the bomb, where it damages only property. As a variation on this scenario, suppose the defendant shoots a mad dog in the street, as in *Putnam v. Payne* (13 Johns. 312 [N.Y. 1816]). Shooting the dog could lead to liability to its owner, but the public necessity doctrine cancels that liability. If the person acting in defense were held liable, he or she would have little incentive to act, given the risk of liability. But a decision not to act puts many others at risk.

3.2. Divergence of Private and Social Costs of Defense

To simplify matters, I assumed at the outset that the private cost and the social cost of taking a defensive action are the same. This is a contestable assumption. It is plausible that the private costs and the social costs of the defensive action differ in some settings.

Suppose the defensive action has a reputational payoff that causes the possessor to view the cost of the defensive action as negative. The benefits to the possessor from the reputational payoff may come at the expense of costs imposed on other members of society. For example, suppose the defensive action establishes a reputation for niggardliness. The reputation may cause others to bear greater costs in efforts to steer clear of the possessor's land; even though they will be compensated under the necessity rule, the possessor's reputation may cause them to search for other docks first.

In view of this possibility, suppose that the possessor's defensive action cost is represented (still) by *a,* and the social cost of the defensive action is represented by $\hat{a}$. Because defensive action imposes costs on other members of society, $a < \hat{a}$. In the absence of the necessity rule, the possessor still has a socially excessive incentive to take the defensive

19. The classic example of public necessity is the case in which a building is pulled down in order to prevent the spread of a fire (*Bishop v. Mayor of Macon,* 7 Ga. 200 [1849]).

action. In the absence of the necessity rule, the defensive action is desirable from a social perspective when $\hat{a} + g < l + c_p + c_d$; while it is desirable from the possessor's perspective when $a < c_p$ (which is assumed to hold). Thus, in the absence of the necessity rule, the possessor will take the defensive action even in instances when it is not efficient. Under the necessity rule, the defensive action is desirable from a social perspective when $\hat{a} + g < l$ and is desirable from the private perspective when $a + g < l$. In the default setting, in which the private cost of defense is positive, the necessity doctrine aligns private and social incentives for defense—because it eliminates the private incentive for defense. In the more general setting, in which the private cost of defense could be negative, the possessor's incentives are not fully aligned with the social interest, but they are closer to the social interest under the necessity rule than they are in the absence of the rule.

This case also covers that of misperception of the cost of defense. One reason for misperception is the inability to evaluate the long-term cost of defense. The long-term cost may involve retaliation.[20] Another reason for misperception is the desire to punish. Experimental evidence has indicated a common preference in ultimatum games for the second mover to punish the first mover who splits a sum of money unfairly. This desire to punish is likely to be especially strong, on the part of the possessor, when an invader takes or attempts to take property from the possessor. This implies that in many settings involving attempted takings, the perceived private cost of defense will be substantially below the social cost, because even if the possessor accurately perceives the social cost of defense, he or she will still deduct the utility gains from punishing the invader. In view of these behavioral regularities, the necessity doctrine may play an important role in dampening the possessor's incentive to defend.

It is also possible that the cost of the defensive action is lower for society than it is for the individual, because the defensive act reduces predators' incentives to invade. If so, the possessor will defend too infrequently from society's perspective under the necessity rule, and the rule does not necessarily move his or her incentive closer to the social incentive.

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20. Retaliation implies costs for both the possessor and the invader. The possessor is unlikely to have information on the retaliation costs of the invader. The result could be a cycle of escalating retaliation, as modeled in Parisi (2001).

3.3. Scope of Application

Much defensive conduct is instinctual. People react immediately to efforts to dispossess them of personal property or to invade their land. Tort law cannot control incentives for instinctual defensive conduct and makes no effort to do so.

I have focused on rational rather than instinctual defensive conduct. This does not severely limit the applicability of the analysis. There are numerous instances in which possessors defend their property on the basis of calculation rather than instinct. The dock owner in *Ploof,* in ordering his servant to untie the plaintiff's boat, did not react instinctively under emergency conditions. The analysis above should be understood to apply primarily to settings in which only property interests are at stake and actors have sufficient time to weigh the costs and benefits of their actions.[21]

Indeed, the time periods for defensive conduct can be divided into roughly three segments. An immediate emergency would be associated with instinctive conduct, which is largely unregulated by tort law. If someone attempts to snatch a purse, and the owner pulls it back with sufficient force to sever the finger of the purse snatcher, there would be no liability in most instances (absent proof that the owner intended to maim the purse snatcher). As both more time and the emergency pass, the owner gains the capacity to rationally weigh the costs and benefits of a particular defensive action. This is the period in which the necessity doctrine operates to regulate defensive conduct. As even more time passes after the invasion without the owner acting, the economics of defense change. The owner's acquiescence may lead to an inference that he or she consented to the taking. Further, the invader will have formed personal arrangements around possession of the property, which may cause the loss he or she suffers from the owner's recapture to be greater than the gain experienced when he or she initially took the property (conversely, the property may depreciate in value during the invader's possession). Last, the invader is likely to take steps to increase the cost of recapture to the original possessor, or may retaliate against efforts to

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21. The interaction between the interests at stake and the conduct regulated by liability rules is more complicated than this implies. *Vincent* is the easiest case to discuss under the rationality model because only property interests were at stake. In *Ploof,* there may have been life interests at stake from the perspective of the invader. From the possessor's perspective, only property interests were at stake. There was no question of compensation to the possessor in *Ploof* and therefore no need to determine whether the invader's conduct was reasonable in view of the emergency conditions and the life interests at stake.

recapture, and thus makes the cost of late-stage recapture substantially greater than that of initial defense. These factors suggest that it may be desirable for courts to constrain the original possessor's freedom to use recapture (as opposed to litigation to recover the item or its market value at the time of dispossession) after sufficient time has passed, as we observe in the general rule requiring peaceful recapture (see, for example, *Bobb v. Bosworth,* 16 Ky. 81 [1808]).

Of course, the mere fact that the cost of recapture is higher than the cost of initial defense of property is insufficient by itself to justify a prohibition of forceful recapture. Given that the cost of initial defense is *a*, suppose that the cost of late-stage recapture is 2*a*. The original owner, after being dispossessed, has a choice between forceful recapture and litigation as methods of recovering the property. Forceful recapture is efficient as a method of recovery if $2a < c_p + c_d$. But even if forceful recapture is inefficient, the original owner may choose it rather than litigation because of a divergence in the private costs and the social costs of defense, which itself may be due to misperception of retaliation costs. The common-law requirement of peaceful recapture reflects a judgment that the cost of late-stage recapture is generally greater than the cost of initial defense and is unlikely to be accurately perceived by the owner.

3.4. Self-Help in Contracts

The model in this paper applies to the problem of self-help in contract law. Suppose, to borrow from Posner (1998, p. 148), a buyer enters into a contract with a builder for a house and finds that the completed house fails to meet all specifications of the initial contract. The buyer has not paid for the house. He or she can refuse to purchase the house, on the ground that the conditions of the contract have not been met, or can purchase the house and sue the builder for the loss incurred by accepting a house that fails to meet the initial specifications.[22] This problem is entirely analogous to the necessity issue in torts.

The defense cost (*a*) is the cost the buyer incurs if he or she refuses

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22. There is a difficult issue concerning the measure of damages, an issue explored by Posner (1998). Should the buyer collect damages for the cost of repair or the diminution in market value? *Jacob & Youngs* (129 N.E. 891) holds that the cost of repair is the default remedy in cases of unintentional breach, unless it is out of proportion to the loss in market value. The harsher remedy (as between the two) is generally required in cases of intentional breach of the sort associated with fraud.

the house.[23] If the buyer can find many other similar houses to purchase, the cost of rejection (defense) will be close to zero. If the buyer cannot find any similar houses to purchase, then the cost of rejection may be substantial. Similarly, if the builder can easily find another purchaser for the house, the cost of rejection to him or her (g) will be trivial.[24] In contrast, if the builder cannot find another buyer at the same price (for example, because the house has special features that do not appeal to most home buyers), the cost of rejection will be large. If the buyer accepts the house, he or she suffers a loss (l). Rejection is efficient, under the assumption that contract breach litigation will occur, only if equation (4) is satisfied, but the buyer will reject as long as the cost of rejection is less than the cost of litigation (that is, equation [5] is satisfied). Hence, there is a divergence between the private incentive and the social incentive to reject. As in the property invasion scenario examined earlier, this problem of incentive divergence would not be observed if litigation were costless. Inefficient rejections are especially likely when the buyer can easily find adequate alternatives to purchase, perhaps because he or she does not care much about the peculiar features or precise location of the house, but the seller cannot easily find alternative buyers.

As Posner notes (1998, p. 148), the law does not allow the buyer to back out of the contract when the alleged breach of contractual conditions is minor. The best illustration of this rule is *Jacob & Youngs, Inc. v. Kent* (230 N.Y. 239, 129 N.E. 889 [1921]), a Cardozo opinion. The home purchaser refused full payment on a large house in which the builder had made a trivial error in construction by installing plumbing pipes, in some portions of the house, of a similar quality but made by a manufacturer different from the one specified in the contract. The builder sued for the remaining payment, and the court ruled in favor of the builder.

Like the necessity rule, the doctrine of *Jacob & Youngs* requires the buyer to compensate the seller for his or her loss from the rejection (g) when the seller's loss from rejection is large relative to the buyer's loss

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23. For a thorough examination of the factors that influence rejection (defense) costs and other costs in all settings in which buyers reject the tender of nonconforming goods, see Priest (1978).

24. This situation is different from the land invasion scenario in the sense that the gain from the breach now consists of the avoided rejection costs and the money saved by failing to comply with the contract. In *Jacob & Youngs,* the costs saved by failing to comply were trivial. If the cost savings had been substantial, then an inference of fraud would have been plausible.

from acceptance (*l*). The rule aligns private and social incentives to reject.[25] And, in a manner similar to the tort setting, late-stage rejection, like late-stage recapture of property, is treated less generously by the law, because of the greater costs to the seller in the contract setting.

The *Jacob & Youngs* scenario can be contrasted with the work of Ben-Shahar and Posner (2011), who examine the case for withdrawal from contracts for standard goods (such as furniture), traded in thick markets, when the buyer cannot determine his or her personal valuation of the good until after experiencing it. The *Jacob & Youngs* scenario involves a (trivial) nonconformity, in which the purchaser has a right to sue for losses resulting from the nonconformity. A rational decision not to fix the nonconformity is equivalent to the rational decision to trespass in the necessity setting (since it occurs because $g > l$). In this setting, the scope for an efficient withdrawal is narrow. In the Ben-Shahar and Posner analysis, the scope for an efficient withdrawal is considerably broader (because both g and a are comparatively small, given a thick market, and because there is no reason to assume that $g > l$). Still, their recommendation that the withdrawing consumer be held liable for depreciation has the effect of aligning private and social incentives to withdraw (reject).

One important difference between the contract setting and the tort setting is that the contracting parties can write provisions in the contract detailing when it is permissible for the buyer to reject. Since the parties will seek to write a contract that minimizes the total costs of the contractual relationship, the contractual provisions will be determined by equation (6). Thus, rejection will be permitted under conditions in which the likely costs of rejection are less than the buyer's loss from acceptance.

4. CONCLUSION

In the absence of the necessity doctrine, property possessors will too often rationally choose to take a defensive action that prevents an invasion of their property. As long as litigation costs are substantial or courts fail to fully compensate for injuries to property, possessors generally will find it cheaper to prevent an invasion through a defensive

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25. Given the argument of the preceding section, this rule provides a solution to the problem of incentive divergence that is robust to errors in the measurement of damages. Alternatively, if the court measures damages accurately and takes factual causation into account (so damages would be $g - l$ instead of g in the case of rejection), there would be no need to apply the balancing test suggested in *Jacob & Youngs*.

action rather than allow it to occur and seek compensation afterward. Invasions that enhance social welfare will be blocked as well as those that do not. The necessity doctrine corrects this inefficiency by aligning the private incentive and the social incentive to defend property.

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