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Coase, Rents, and Opportunity Costs

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COASE, RENTS, AND OPPORTUNITY COSTS

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Professor Posin is to be congratulated on his recent article in this Review, "The Coase Theorem: If Pigs Could Fly,"[1] for creating a precise example that purports to disprove the Coase Theorem. Legal scholarship should strive more towards verifiable or falsifiable statements about the law. Of course, falsifiable statements are a risky strategy, and in this case the risk has materialized.[2] Posin's claim—that his example shows a flaw in the Coase Theorem—is false.

Posin's claim is an especially bold one, for his example deals with a shifting legal entitlement between two producers. Most successful attacks on the Coase Theorem have critiqued its purported applicability to consumers. Indeed, Professor Coase himself has recently declared that he never claimed his analysis could be applied to consumers.[3] Thus, if correct, Posin's claim that the Coase Theorem fails as applied to producer behavior would be news indeed.

Professor Posin is also to be congratulated on a clever title to his article. He colorfully suggests that the reasoning surrounding the Coase Theorem is like assuming pigs have wings, and then constructing "a science of animal husbandry around the principle of porcine aerodynamics."[4] He implies that a world where pigs

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1. Posin, *The Coase Theorem: If Pigs Could Fly*, 37 WAYNE L. REV. 89 (1990).

2. I know how it feels, for I once made a falsifiable prediction about Coase that has proven false. To dramatize Coase's own lament that economists have ignored him, I predicted that Coase would never win the Nobel Prize. Schwab, *Coase Defends Coase: Why Lawyers Listen and Economists Do Not*, 87 MICH. L. REV. 1171, 1190 n.62 (1989). I am delighted that my statement has been proven false.

3. Speech to the Law and Economics Section luncheon at the American Association of Law Schools annual meeting, Washington, D.C., January 4, 1991. Coase pointed to the first sentence of *The Problem of Social Cost*, which reads: "This paper is concerned with those actions of *business firms* which have harmful effects on others." Coase, *The Problem of Social Cost*, 3 J. L. & ECON. 1, 1 (1960) (emphasis added).

4. Posin, *supra* note 1, at 114.

can fly is not earth. I agree that the Coasean world[5] is a strange place. I will not claim that pigs can fly in such a world, but wooden accountants cannot soar either. Certainly, whether the rule of law is for or against him, a cattle rancher will add ponies to the herd if that is the best alternative, and will add cows if they become more profitable again. Wooden accounting measures of cost and rate of return, which infect Posin's analysis, are unlikely to capture the dynamics of the Coasean world.

Finally, Posin is on to something when he suggests that rents are an essential part of the Coase Theorem (although rents are not essential). After examining how Posin erred, I will attempt to make a silk purse out of this fallen pig by discussing several features of the Coase Theorem that Posin's example touches on, particularly the necessity for rents in the Coase Theorem.

I. Posin's Mathematical Example

It is tedious, but the sure way to refute Professor Posin is to dive into his algebraic example. Professor Posin posits a rancher who can sell cows for $550 each, but raising cows becomes more expensive with each cow (that is, the rancher faces a rising marginal cost curve).[6] As we will see, it is critical that these marginal costs do not include the profit the rancher could have gained by putting his resources to another use. These cows also damage the neighboring farmer's crops, and more cows cause increasing damage.[7] The basic Coasean inquiry is whether a legal rule making the rancher liable for crop damage will alter the size of her herd.

So far, the example is a familiar one. The wrinkle Professor Posin adds is to consider explicitly the rancher's alternative to cattle ranching. Rather than cows, Posin posits, the rancher could

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5. Coase himself has been at pains to say that the Coasean world of zero transaction costs is not his world. R.H. Coase, The Firm, The Market, And The Law 174 (1988). As he says, "[i]t is the world of modern economic theory, one which I was hoping to persuade economists to leave." *Id.* Coase was simply trying "to bring to light some of its properties." *Id.* Coase would certainly agree that the world of zero transaction costs is strange, but would probably doubt that pigs could fly there.

6. Posin, *supra* note 1, at 95. In Posin's specific example, the marginal cost of producing cows $MCu = u/10 + u^2/20$, is an upward sloping function.

7. *Id.* at 107. The crop damage to the farmer of an additional cow is $MDFu = u/4 + u^2/6$, again an upward sloping function.

raise ponies. Ponies cost the same to raise[8] but can only be sold for $200 rather than the $550 cow price. The advantage to raising ponies is that they never trample the farmer's crop. The important thing for us to remember is that the rancher can net $200 from the first pony. Professor Posin emphasizes that this $200 return from the first pony is the opportunity cost of continuing to put resources into cows. Thus, Posin separates the direct costs of raising cows from the opportunity costs.

As Coasean theorists typically do, Professor Posin then considers how many cows the rancher will raise under shifting rules of liability. In the first scenario he considers an open range law where the rancher is not liable for crop damage. To avoid damage, the farmer will offer to pay the rancher not to add another cow to the herd. The farmer is willing to pay an amount up to the marginal damage a cow inflicts. By adding another cow, the rancher gets $550 less the marginal cost of raising the cow, but must reject the farmer's offer to pay an amount equal to the crop damage from the cow. Consequently, the rancher will keep adding cows until $550 minus the marginal cost equals the marginal crop damage, which occurs at fifty cows.[9]

What about the pony alternative? Posin checks this at the end.[10] The return to the rancher of the fiftieth cow is $550-$130 = $420, far above the $200 that the first pony would bring. Therefore, claims Posin, the rancher will not yet turn to ponies and will run fifty cattle. The fifty-first cow, however, causes more crop damage than the rancher earns on the cow. As a result, the rancher and farmer are able to reach a mutually satisfactory deal

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8. *Id.* at 97. One nit I have with Posin is his justification for a rising marginal cost curve: "As more input units are used, their price goes up." *Id.* at 94. Posin thus assumes that the rancher is not a price-taker in the input market, even though she is a price-taker in the product market (she can sell as many cows as she can produce at $550 each). What he may have in mind is a rancher who sells beef on a national market, but hires cowhands locally. While Posin says this is "the usual case," most models posit a competitive firm that treat input prices as exogenous. Nothing turns on this, except that the story of rising input prices is inconsistent with his later assumption that the rancher can produce the first pony cheaply regardless of the number of cows produced. If the input price has risen because of the large number of cows produced, why are input prices suddenly low when the rancher switches to ponies? After all, by Posin's assumption the rancher uses the same inputs for cows or ponies.

9. As does Professor Posin, I round all numbers to the nearest whole number.

10. Posin, *supra* note 1, at 107.

to prevent addition to the herd. Accordingly, Posin declares that the ultimate size of the herd is fifty cows.

To preview my objection to Posin's analysis, I note that Posin ignores that by putting resources into each new cow the rancher must reject two opportunities: (1) the farmer's offer to pay to limit the herd; and (2) Posin's own wrinkle—using those resources to raise a pony. Posin never confronts his rancher with both opportunities at the same time. Ultimately, I agree that the herd will be fifty cows, but the story is messier than Posin's incomplete account.

The final step in Professor Posin's "proof" is to ask how many cows the rancher will run in the second scenario, where an enclosure rule makes her liable for crop damage. In this scenario, the rancher gains $550 from another cow (as before), but must incur both the marginal costs of raising the cow and the marginal crop damage the cow causes.[11] The net gain of the thirty-ninth cow is $207 ($550-80-263), more than a pony will earn. The fortieth cow, however, only nets $189. The rancher will thus turn to ponies and earn $200 on the next unit. In this scenario, Posin emphasizes the possibility of turning to ponies, but ignores the possibility of the farmer's bribe.

This completes Posin's proof. When the rule of law is against the rancher, Posin claims, she only runs thirty-nine cows; when it is with her she runs fifty.[12] Posin does not consider whether either scenario produces an efficient result, a potentially serious gap in his argument.

Why is the Coase Theorem wrong? Professor Posin argues that Coasean theorists have botched the concept of opportunity cost.[13] They emphasize opportunity cost when considering the farmer's payments to the rancher in the first scenario's open range rule, but ignore the possibility of switching to ponies—another type of opportunity cost—under the second scenario's enclosure rule.

Having "shown" that the Coase Theorem fails in his example, Professor Posin describes the "momentous" implications for law-and-economics analysis.[14] I will return to some of Professor Posin's implications later, in attempting to learn from his mistake, but if the actors in his example act consistently with the Coase Theorem, such momentous implications never materialize.

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11. *Id.* at 108-9.
12. *Id.* at 110.
13. *Id.* at 115.
14. *Id.* at 117.

II. POSIN'S ERROR

A. Scenario One—Rancher Not Liable for Crop Damage

Let us return to the first scenario, where the rancher suffers no legal liability when her cows trample the farmer's crops. I agree with Professor Posin's ultimate conclusion that the rancher will raise fifty cattle, but Posin's pony wrinkle makes the analysis more cumbersome than he realizes. He suggested that the rancher would run fifty cattle, then turn to ponies. In fact, the rancher will first run thirty-nine cattle, then turn to ponies for a while, then back to cows, back to ponies, and so on until the rancher has fifty cattle and sixty-two ponies.

To see this, let us watch the rancher build her cattle and pony herds unit by unit, placing each unit where it can earn the greatest return. Using the first unit as a cow would earn $550 and cost a trivial amount. Because the first cow causes trivial crop damage, the farmer would offer only a trivial amount not to run the cow. The first unit as a pony would earn only $200 and cost a trivial amount (and, by assumption, cause no crop damage and therefore, the farmer would pay nothing to the rancher for eliminating the pony). Therefore, the rancher uses the first unit as a cow.

As the rancher continues to add cows, she incurs the increasing cost of cows. But she also must consider two opportunity costs by continuing in cows: (1) she forgoes the farmer's offered payment for eliminating cows, which increases as the crop damage from more cattle increases; and (2) she forgoes the return from ponies, which for the first pony will be $200, but will decrease for subsequent ponies as they become more costly to raise.

Initially, units are most profitable in cows. Having put the first thirty-eight units into cows, how will the rancher use the pivotal thirty-ninth unit? As a cow, unit thirty-nine would earn $550 and would cost $80, for a net of $470. As a pony, unit thirty-nine would earn $200, cost a trivial amount, and the farmer would be willing to pay up to $263 not to use this unit as a thirty-ninth cow, for a total of $463. The most profitable use of unit thirty-nine is as a cow, but not by much.

Unit forty as a cow will again earn $550 and now cost $84, for a net of $466. Using this unit as a first pony would earn $200. In addition, the farmer will pay up to $277 not to add a fortieth cow. The total gain from using this unit as a pony is $477. The rancher switches to ponies!

How many ponies will the rancher add? The cost of raising ponies continues to grow. Meanwhile, the next cow will still earn

a net of $466, although the rancher would forego the farmer's payment not to add a fortieth cow, which is standing firm at $277. Thus, the rancher will add ponies as long as the next pony makes more than $189 ($466-$277). The fifteenth pony costs $13, for a net gain of only $187 ($200-$13). The rancher is better off using this unit as a fortieth cow.

What about the next unit, once the fortieth cow is in place? As a forty-first cow, it will earn $550 and cost $88, for a net of $462. The fifteenth pony, we just said, will net $187, and the farmer will raise his payment to $290 not to add a forty-first cow, for a net pony gain of $477. The result: switch back to ponies! But again, the increasing cost of ponies will eventually make another cow more attractive than another pony, and the rancher will switch again.

This switching becomes tedious to watch, so we take a nap and wake up when the rancher finally rests. This will occur when she has fifty cows and sixty-two ponies. At this point, adding either a cow or a pony would decrease rather than increase profits.[15]

In sum, Posin correctly indicates that the rancher will have fifty cows and sixty-two ponies.[16] Posin gave no hint of the complicated switching process, however, because in the first scenario he ignores the possibility of both accepting the bribe and turning to ponies. As ponies become increasingly less profitable though, the farmer's bribe dominates the rancher's pony-opportunity-cost calculations. This is how Posin reaches the correct end-state while ignoring the process of switching between cows and ponies.

B. Scenario Two—Rancher Liable for Crop Damage

Scenario two is simpler to analyze. When adding a cow to the herd the rancher faces the direct liability cost of crop damage, rather than an opportunity cost of forgoing the farmer's bribe. Nevertheless, as Posin emphasizes, by adding cows the rancher still faces the opportunity cost of not turning to ponies. Professor Posin believes that in this scenario the rancher will stop at thirty-

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15. The 63rd pony would earn $200 and cost $205—clearly a losing proposition. The 51st cow would earn $550, would cost $135, and cause crop damage of $446. The opportunity cost of switching to a 63rd pony is now negative. Even with no pony alternative, however, the Rancher is better off accepting the Farmer's payment and keeping the cattle herd at 50.

16. Posin, *supra* note 1, at 98.

nine cows.[17] Unfortunately, Posin closes his eyes at this point. If he had stayed awake, he would have seen the rancher turning to ponies after thirty-nine cows, but turning back to cows as ponies become less profitable. The rancher continues switching until she again has fifty cows and sixty-two ponies. Indeed, as we shall see the switching process is exactly the same as in the first scenario.

It is easy enough to agree with Posin that after thirty-nine cows, the rancher turns to ponies. As we saw in scenario one, the fortieth cow earns $550, but costs $84 to raise and damages $277 worth of crops, both of which the rancher pays for in this enclosure-rule scenario. The net of $189 is less than the $200 the rancher would earn from starting the pony herd.

But we can't fall asleep now, with the rancher just starting her pony herd. Ponies become increasingly expensive to raise, and the fifteenth pony would net only $187. A fortieth cow is more profitable. However, the forty-first cow nets only $172 ($550-$88-$290), so instead the rancher adds that fifteenth pony. Yet the twenty-third pony only nets $171, so now it's time to add a forty-first cow. Similarly the forty-second cow nets only $153, so better to add another seven ponies. The farmer will continue adding a cow, then a few ponies, then a cow, until she reaches fifty cows and sixty-two ponies.

In short, the size of the cattle and pony herds in Professor Posin's example is the same whether or not the rancher is liable for crop damage. Posin and I agree that the farmer grows the same crops under either legal rule and that the rancher will raise fifty cattle when the liability rule favors her. Posin wrongly suggests, however, that the rancher would only have thirty-nine cows when the liability rule is against her.

The ultimate test of my assertion is to ask whose rancher makes more money in scenario two—my rancher with fifty cows or his rancher with only thirty-nine cows. Posin correctly calculates the rancher's total profits for fifty cattle when the rancher is liable for crop damage as $18,035.[18] Using Posin's own equation, the total profit from thirty-nine cows is only $16,900.[19] As my rancher makes more than Posin's, his rancher cannot be maximizing profits.

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17. Posin, *supra* note 1, at 110.

18. *Id.* at 113 n.30.

19. Total profit is calculated by taking the definite integral of the marginal revenue minus marginal cost curve. Total profit equals $550u - [u^2/20 + u^3/60] - [u^2/8 + u^3/18]$. For 39 cows, this equals $16,900.

This switching back and forth between cows and ponies is a messy story. My apologies for inflicting it on the reader are muted by noting that it comes from Posin's assumption that the number of cows already produced does not affect the cost of raising ponies, and vice versa.[20] Thus, after raising several cows the next cow becomes expensive relative to a pony, so it pays to switch to ponies. After raising several ponies, however, cows again look relatively attractive.

Posin stresses that this independence assumption is not critical to his conclusions.[21] Nor is it critical to my conclusion that legal liability does not change the herd size. A clearer assumption would be to assume that the rancher can produce cows and ponies interchangeably, but that the cost of producing the next livestock depends on the total number of livestock (cows plus ponies) already produced. In this situation, the rancher will begin with cows, then switch once to ponies. As one would expect, when the technology of the situation changes, the optimal number of cows and ponies also changes. In this case, the rancher would have forty-five cows and seventeen ponies. Again, the basic point is that herd size is invariant to legal liability.

III. Lessons to Learn

The danger in an extensive reply to a mathematical example is that the argument becomes muddled and the reader leaves without recognizing the basic points. To combat this danger, let me outline in general terms the point Posin was trying to make and why he must be wrong.

Posin specified a particular marginal cost curve for the rancher, and then added a separate opportunity cost curve (the possibility of raising ponies). Immediately, he has tipped his hand as an accountant and not an economist. An accountant views costs as the debit side—money you pay out. To an economist, costs can be debits and foregone credits—direct and opportunity costs. No harm comes from separating out types of costs, as long as one remembers both types. To help us remember, let us write them down explicitly:

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20. More formally, Posin is assuming that the Rancher has identical, separable production functions for cows and ponies. Posin never states explicitly that the cost of raising a cow does not depend on the number of ponies already produced, because he never envisions a rancher switching back to cows after producing ponies. My analysis assumes this "vice versa" independence.

21. Posin, *supra* note 1, at 97.

(1) Direct Cost of Raising Marginal Cow = $u/10 + u^2/20$
(2) Crop Damage of Marginal Cow = $u/4 + u^2/6$
(3) Opportunity Cost of Marginal Cow (Foregone Revenue from Next Pony) = $200-(p/10 + p^2/20)$,
where "u" is the number of cows in the cattle herd and "p" is the number of ponies in the pony herd.

Posin emphasized that the rancher has an alternative to causing crop damage—namely, raising ponies. He attempts to capture this in equation (3). But equation (3) and equation (2) are not alternatives. Rather, in deciding whether to produce another cow the rancher always faces both costs (as well as the direct costs of (1)), regardless of legal rule.

Indeed, the whole point of the Coase Theorem is that the rancher always faces equation (2), regardless of legal rule. With an enclosure rule (scenario two), the rancher incurs crop damage as a legal liability. With an open range rule (scenario one), the rancher forgoes the farmer's payment not to expand the herd, and the maximum payment is again the crop damage. The former is a direct cost and the latter an opportunity cost, but not the opportunity cost that Posin addresses. The controversy over the Coase Theorem is whether the rancher will treat these costs the same.[22] The most obvious caveat is that transaction costs may prevent the farmer from offering a payment, in which case the rancher will not face the costs of equation (2) under an open-range rule. Posin, however, does not challenge the invariance of equation (2). Instead, he diverts attention toward equation (3), which does not change with a shift in legal rule and thus cannot offer insight about the Coase Theorem.

Posin claims Coasean theorists typically ignore equation (3), but this is not so. Rather, Coasean theorists usually combine equation (3) with equation (1), treating all costs together but for the crop damage costs. The reason for combining opportunity costs with direct operating costs is not to ignore them. Rather, the point is to focus on the critical inquiry of the Coase Theorem, which is how legal rules alter costs that legal actors face. A legal

22. Mark Kelman has challenged the assertion that people treat opportunity costs like other costs. *See* Kelman, *Consumption Theory, Production Theory, and Ideology in the Coase Theorem*, 52 S. CAL. L. REV. 669 (1979). Kelman's challenge has serious implications for the Coase Theorem as applied to consumers. *See infra* note 2 and accompanying text. But Posin does not take Kelman's line of argument, accepting the economist's notion that actors will weigh opportunity costs as seriously as other costs.

rule about crop damage might affect the rancher's consideration of equation (2), and thus our focus is properly there. But a change in a crop-damage rule will not alter the rancher's consideration of equation (3), which deals with ponies.

In short, Posin unnecessarily complicates standard Coasean analysis by separating equation (3) from equation (1), a move that cannot affect the Coase Theorem. This is poor modeling, because it diverts attention from the issues of interest, which revolve around equation (2). As Professor Polinsky has so ably explained, "[t]he art of economics is picking assumptions that simplify a problem enough to better understand certain features of it, without inevitably causing those features to be unimportant ones."[23] The art of economics also comes in avoiding unnecessary clutter in the analysis, because with clutter comes loss of insight. Apparently the clutter confused Posin's rancher, who lost sight of some of her costs as she switched back and forth between ponies and cows.

Enough has been said about Posin's mistake. Do any general lessons come from it? Let me attempt to make a silk purse out of this fallen sow's ear by discussing several features of the Coase Theorem that Posin's example illustrates.

A. Invariance and Efficiency

First, Posin's method of argument is flawed. Posin's strategy was to disprove the Coase Theorem by showing that the rancher has fifty cows when the liability rule favors her and only thirty-nine cows when the liability rule favors the farmer. Now, Posin incorrectly asserted the rancher would stop at thirty-nine cows in scenario two. But even if he were correct, this would only invalidate the invariance thesis, not the entire Coase Theorem.

The Coase Theorem, as Donald Regan ably recognized,[24] contains two assertions. The first is the *Efficiency Thesis*: assuming zero transaction costs, actors will reach an efficient result regardless of the legal rule.[25] The second is the *Invariance Thesis*: assuming

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23. A. MITCHELL POLINSKY, AN INTRODUCTION TO LAW AND ECONOMICS 4 (1983).

24. Regan, *The Problem of Social Cost Revisited*, 15 J. L. & ECON. 427 (1972).

25. I have suggested a further breakdown of the efficiency thesis. The strong efficiency hypothesis claims parties will always reach efficient results, regardless of the legal rule. The weak efficiency hypothesis suggests that parties will have a strong tendency toward efficient results, and the legal rule will not affect whether the parties reach efficiency. *See* Schwab, *A Coasean Experiment on Contract Presumptions*, 17 J. LEGAL STUD. 237, 242-44 (1988).

zero transaction costs, actors will reach the same result regardless of legal rule. The invariance thesis requires stronger conditions, such as an absence of wealth effects, actors who treat equal opportunity and realized costs as equivalent, the ability of entitlement holders to exclude others, and preferences that are determined independently of the law.[26] Many scholars rejecting the invariance thesis find insights in the efficiency claims of the Coase Theorem.

Professor Posin does not argue against the efficiency thesis, for Posin does not analyze whether the thirty-nine-cow and fifty-cow results are efficient or inefficient. If under an enclosure rule thirty-nine cows is the efficient result, and under an open-range rule fifty cows is efficient, Posin's example is consistent with the efficiency thesis.

B. Wealth Effects

As I have tried to prove, Posin's example, properly analyzed, is consistent with the invariance thesis as well. The rancher raises fifty cows under either legal rule. For this reason, now is not the time to delve into the minutiae of the invariance debate. However, I would like briefly to discuss the most common explanation for the failure of the invariance thesis—wealth effects.

The wealth effect attack on the Coase Theorem involves the following argument. A property entitlement increases a consumer's wealth. This shifts out his budget constraint, which directly affects his demand for goods, including his willingness and ability to reject offers to buy his entitlement. If the effect is sufficiently dramatic, a consumer with the initial entitlement may refuse to sell the item, even though the same consumer, when the law switches, is not willing and able to buy the item back. If so, the efficiency of the situation depends on the initial legal entitlement.

For example, suppose we are analyzing an entitlement of residents to clean air versus an entitlement of factories to pollute. The entitlement to clean air, like other assets, increases the residents' wealth, and should increase their demand for clean air.[27] If the wealth effect is great enough, once the law switches to a clean

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26. These conditions are more likely to hold for producers than consumers, which has led me to argue that the invariance thesis is more plausible for entitlements involving producers. Schwab, *supra* note 2, at 1183. *See also supra* note 3 and accompanying text.

27. Technically, the assertion that people demand more of an item when their wealth increases is only true for normal goods. For inferior goods, demand goes down as wealth increases.

air entitlement, residents who were not willing and able to pay the factory enough to stop polluting would be unwilling to sell this right back to the factory. If so, the result when the law allows pollution is pollution, and the result when the law entitles residents to clean air is clean air. Each result is efficient—preserving the efficiency thesis—but different—invalidating the invariance thesis.

Posin fears that Coasean theorists will attack his results as an example of a wealth effect, "which the Coase Theorem assumes is not present."[28] Posin correctly rebuts the anticipated attack, stating that a wealth effect "is not what we are discussing here."[29]

Coasean theorists, however, will easily recognize why wealth effects are not present. Posin's example deals with profit-maximizing producers rather than consumers. Production decisions, unlike consumption decisions, are not affected by the wealth of the decisionmaker. In deciding whether to produce another cow, a profit-maximizing producer does not consider her existing wealth. If an additional cow will increase profits she will produce another cow.

Legal rules about producers can have indirect wealth effects, because the individuals making up the production firm also wear consumer hats. For example, a switch to an open-range rule will increase the wealth of current ranch shareholders and decrease the wealth of current farm shareholders.[30] If ranch shareholders and farm shareholders differ in their demand for beef, the legal switch will alter demand. If demand rises, in the long run more resources will go into farming and herds will increase.

Nevertheless, Posin's example implicitly rules out this indirect wealth effect as well. His price-taking rancher can sell as many cows as she wants for $550 per cow, under either legal rule. This can only happen if the demand for beef remains unaltered by the legal rule. Implicitly, Posin's farmer and rancher, when wearing their consumer hats (or should I say consumer bibs) are equally avid steak eaters.

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28. Posin, *supra* note 1, at 112.

29. *Id.*

30. Coase argues that, assuming zero transaction costs, such switches will not have even a one-time windfall wealth effect. Under zero transaction costs parties can write and enforce contracts covering any contingency, including a future switch in the law. Coase, *supra* note 5, at 171. In the present text I ignore Coase's argument, and assume that shifts in property entitlement will have windfall wealth effects.

C. *Making and Cutting Pies*

As Robert Cooter,[31] Don Regan[32] and many others have ably shown, the Coase Theorem makes a strong assumption that bargainers can, and will, separate two related activities: maximizing the joint gains of an interaction, and dividing the gains between them. It is questionable whether this separation is a profit-maximizing strategy for individual bargainers. In general, a bargainer might do better with a strategy that loses some joint surplus if it allows him to gain a larger share. For example, a buyer might understate his valuation of some goods, hoping that the other party will sell them for less but risking that not all of them will be transferred. Such a strategy does not lead to Pareto-optimal outcomes, because whenever part of a pie is left uncooked, both parties could gain by cooking the extra portion and dividing it. Nevertheless, individual rational bargaining strategy may lead to uncooked pie.

Professor Posin, however, never challenges the Coasean assumption that parties will find and agree to all gains from trade. Indeed, as already pointed out, Professor Posin does not determine the point that maximizes joint gain (often termed the socially efficient outcome). The question is often asked: "If you owned both the ranch and the farm, how many cows and ponies (and how much corn)[33] would you want?" In Professor Posin's example, fifty cows and sixty-two ponies is the socially efficient situation. It produces a joint gain, net of costs, of $18,035 for the cows plus the net gain of the ponies ($8,236) and crop. Posin never asks why the parties, in the rancher-liable scenario, make joint profits of only $16,900 plus the net gain of ponies and crop. What makes them throw away $1,135?

Accepting the basic Coasean assumption that parties make all jointly efficient deals, one answers that the parties will not throw away this money. The rancher, in this liability scenario, faces all the benefits and costs of his actions, Posin gives no intuition why the rancher will not fully exploit this situation by producing fifty cows. Indeed, the prior analysis shows that she would.

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31. Cooter, *The Cost of Coase*, 11 J. LEGAL STUD. 1 (1982).

32. Regan, *supra* note 24.

33. Posin assumes that the farmer cannot vary crop production, and that it is always profitable to grow crops rather than leave the land fallow. Posin, *supra* note 1, at 104. Because of this constant crop production, we need not consider the amount of crops in our social calculus.

There is irony in Posin's purported solutions. According to Posin, when the law forces the rancher to internalize all the costs of production by making her liable for crop damage, she underproduces cows.[34] When the law puts responsibility for the rancher's cows on the farmer, the rancher produces an optimal amount. This is counterintuitive. The usual idea (dare we call it the Pigovian idea) is that a legal regime that allows ranchers to impose costs on others will lead to overproduction. By never inquiring about social efficiency, Posin never sees the oddity in his claims.

D. Rate of Return Effect

Posin terms his idea the "rate of return" effect.[35] He correctly calculates that under an open range rule the rancher earns $25,292 from a fifty-cow herd. When liable for crop damage, however, a fifty-cow herd only earns profits of $18,035. If the rancher has $100,000 invested in the ranch, says Posin, this is a difference in the rate of return of 25% versus 18%.[36]

Posin "raises the possibility" that the rancher will invest in fewer cows when the legal rule reduces the rate of return.[37] It seems intuitive to cut back when things go less well. But the non-intuitive Coase Theorem says no. The accountant regards the rancher as better off when the legal rule favors her. The greater wealth is real (that is, the rancher is more likely to buy a Cadillac when the legal rule suddenly favors her). Nevertheless, a shift in legal rule will not alter the size of her herd. Under either rule, fifty cows is the profit-maximizing size. Herd size remains the same because the legal rule does not alter the technology of the situation. The socially efficient outcome—what a single owner of the ranch and farm would do—remains unaltered by a shift in legal liability.

Instead, the price of ranch land will fall, and farm land rise. Suppose the market price for ranch land is $100,000 under an open-range legal regime. If the legal rule is then unexpectedly and permanently switched to an enclosure law, subsequent ranchers would pay less than $100,000 for the ranch, even though the ranch optimally supports the same size herd. The switch in legal rule, then, does not permanently decrease the rate of return of ranchers,

34. *Id.* at 110.
35. *Id.* at 113 n.30.
36. *Id.*
37. *Id.*

but instead creates a one-time windfall loss for current ranchers.

E. Rents

The Coasean story says a rancher will not alter her output after a switch in legal rule even though she earns less profits. This sounds like a story about rents. The big question, then, is whether the Coase Theorem only applies to a situation where the parties earn rents.

Posin argues that his example shows the Coase Theorem "only holds when the Cattle Raiser's entire profit is net economic rent."[38] Economic rent, as Posin recognizes, occurs when a party makes more profit than necessary to keep him engaged in that activity. It is "trivial," suggests Posin, to point out that a party earning rents will not reduce activities when a switch in legal regimes takes away some of the rent. This is inherent in the definition of rent. But this is all the Coase Theorem does, says Posin. By allowing the rancher to switch to ponies, Posin claims to have eliminated economic rent from his example. He asserts that it is the absence of economic rent which destroys the Coase Theorem.

Posin says he is unaware of any assertion in the legal literature that the Coase Theorem is valid only where the entire profit is net economic rent.[39] Prior Coasean exegesis, however, has analyzed the rents issue. G. Warren Nutter defended the Coase Theorem in a 1968 article by arguing that a change in legal rule would redistribute rents but not reallocate resources.[40] Donald Regan,[41] in a well-known article cited by Posin, granted that Nutter may be correct in the class of cases where rents by each activity, when favored by the legal rule, were at least equal to the damage caused by the externality. But, Regan insisted, when no factor is earning rents the switch in legal rule must alter outcomes:

> In the general case, there may be no factor which is earning any rent at all in the favored activity. All factors may be earning only their opportunity cost of employment in that activity. Plainly, if no factor is earning any rent in the favored activity, then a change of legal rule which makes

38. *Id.* at 111.
39. *Id.* at 112.
40. Nutter, *The Coase Theorem on Social Cost: A Footnote*, 11 J. L. & ECON. 503 (1968).
41. Regan, *supra* note 24, at 433-34.

that activity disfavored cannot merely redistribute rents.[42]

Professor Coase himself has responded to the criticism that the Coase Theorem requires rents to operate. In an 8-page section of his 1988 book (also cited by Posin) entitled "The Coase Theorem and Rents," Coase finds Regan's contention "plausible" but "wrong."[43] Suppose the farmer has the initial entitlement. Since he earns no rents from farming, Coase reasons, the farmer would sell his entitlement for an infinitesimal sum and turn to alternative occupations and investments. If the rancher can have the entitlement for free, asks Coase, how can one say the rancher does not have the right to it? Liability and nonliability are interchangeable. The rancher and farmer, each earning zero rent, "are equally likely to stay or leave. What will happen is completely unaffected by the initial legal position."[44]

Unfortunately, Posin's example, as written, cannot help us referee this debate,[45] because Posin's rancher does earn rents on her cows.[46] It just happens that, after a certain amount of cattle production, she earns greater rents from ponies.

Because Posin's example is flawed, I will only sketch here how one might model a Coasean interaction with zero rents. First, one could specify a total cost curve that has both fixed and variable costs, such that with an optimal size herd the rancher earns no rents, at least in the short run. Second, one could specify a constant marginal cost curve, which eliminates rents even in the long run. The Coase Theorem holds in either situation.

1. Fixed Costs

Suppose, to undertake ranching, a rancher must face fixed costs that equal exactly the discounted present value of the future operating profits from the herd. If so, the rancher earns no rents (that is, no excess profits). No one would enter ranching if the operating profits were any less.

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42. *Id.* at 433.

43. Coase, *supra* note 5, at 164. Coase also responded to Auten's discussion of rents and the Coase Theorem. *See* Auten, *Discussion*, in THEORY AND MEASUREMENT OF ECONOMIC EXTERNALITIES 38 (S.A.Y. Lim. ed. 1976).

44. Coase, *supra* note 5, at 165.

45. I have previously sided with Coase on this point. Schwab, *supra* note 2, at 1184.

46. Posin's rancher also earns rents on her ponies, because up to a certain point they earn revenues far exceeding their costs. Posin's farmer likewise earns rents, because she stays a farmer regardless of the costs imposed on her.

This rancher is consistent with Posin's rancher.[47] Unfortunately for Posin, adding fixed costs to the example will not lead the rancher to alter the size of her herd. The only difference between this situation and Posin's original example is the explicit recognition of fixed costs. Fixed costs do not affect the marginal calculation of the size of the herd. Fifty cows contribute more to overhead than any other size herd.

Two objections might be made to the fixed cost example. First, one might object that a rancher with fixed costs is not a good example of someone earning no rents, for in the short run she earns quasi-rents. That is, once she has paid out the fixed costs, she will produce as long as she covers her immediate expenses, or what the economist calls variable costs. Thus, one might expect that such a person would not alter production when the legal rule switches and she earns less profit. To address the quasi-rent objection we must turn to a constant marginal cost model, which we do next.

Second, the rents argument, as articulated by Regan, focused on the person who must pay a bribe to avoid the harm (the farmer, not the rancher). The point was that the farmer would have no incentive to pay when he earns no rent, because he would prefer switching to his next-best alternative. To examine this point, we should make the farmer, rather than the rancher, earn zero rents.

Anyone who has accepted Coase's idea that harm is reciprocal will suspect that outcomes are unlikely to differ by emphasizing whether an actor must pay a bribe rather than receive a bribe. But let us briefly go through the example to convince the skeptics.

Again, let us introduce fixed costs that just equal the farmer's operating profits when operating with a favorable enclosure rule. Such a farmer earns no rents. The farmer receives liability damages from the rancher for the crop damage caused by fifty cows. Suppose the law suddenly switches to an open-range rule, so that the farmer now incurs crop damage without legal recourse. Such a farmer who was just breaking even with a favorable rule, Regan argues, would rather turn to alternate activities than pay the rancher not to increase the herd. But once the fixed costs are sunk, the farmer will do better by staying and paying the rancher, as long as the farmer covers his variable costs. The analysis is the

47. Suppose the total direct cost of raising cows is $TC = F + u^2/20 + u^3/60$, where F is the level of fixed costs. This total cost curve is consistent with Posin's marginal cost curve. If $F = \$18,035$, the rancher earns zero excess profits when the herd is 50 cows.

mirror image of the example where the rancher with fixed costs earned quasi-rents.

2. Constant Marginal Costs

Suppose under an enclosure rule a rancher and adjoining farmer earn zero rents or quasi-rents. One way to model this would be to have both face constant marginal costs over the entire range of production and be selling at cost. Part of the rancher's costs include liability damage from straying cows. To make the example easy, suppose each cow tramples corn worth $5 on one acre of land. Table A stylizes a possible situation.

Table A
BALANCE SHEETS UNDER AN ENCLOSURE RULE
PARTIES JUST COVER TOTAL COSTS

	Rancher's $ Per Cow	Farmer's $ Per Acre
Revenue	+ $105	+ $200
Operating Costs	- $100	- $200
Trampling Damage Payments	- $5	+ $5
Trampling Damage	N/A	- $5
BALANCE	$ 0	$ 0

Both the rancher and farmer are just covering their costs and therefore could both operate. Suppose the legal standard changes to an open-range rule, making the farmer ineligible for trampling damage payments. He now loses $5 per acre. One might argue that because he has no rents or quasi-rents with which to pay the rancher, he will go out of business. And so he might. But this does not disprove the Coase Theorem, for Table A presents an unstable situation. Even under an enclosure rule, the farmer will go out of business. Rather than pay liability damages of $5 per cow, the rancher would prefer to pay, and the farmer would be willing to accept, an arbitrary small sum for the farmer to go out of business. When the farmer shuts down, the rancher begins earning rents of $5 per cow. The Coase Theorem remains intact, but rents have reappeared.

To finally abolish rents from the situation, let us move to Table B, which is identical to Table A except that the rancher's

revenue just covers operating costs and is insufficient to cover trampling damages.

Table B
BALANCE SHEETS UNDER AN ENCLOSURE RULE
PARTIES JUST COVER OPERATING COSTS

	Rancher's $ Per Cow	Farmer's $ Per Acre
Revenue	+ $100	+ $200
Operating Costs	- $100	- $200
Trampling Damage Payments	- $5	+ $5
Trampling Damage	N/A	- $5
BALANCE	$ - 5	$ 0

It may seem the rancher should go out of business, rather than suffer losses of $5 per cow. And so she should. But an infinitesimally small payment can cause the farmer to quit instead. When the law switches to an open-range rule, the rancher no longer pays trampling damages and can now cover her costs. She can remain in business. But for an infinitesimally small payment she will willingly drop out and the farmer can stay.

Thus, while we finally have a situation of zero rents, the Coase Theorem's invariance prediction remains inviolate. As in the prior situation, the rancher and farmer should not both operate; when one drops out, the other can earn zero rents and is content to operate. Social efficiency does not care which party stays. The legal rule does not affect which party will stay. Even under a stable rule of law, actors earning zero rents could arbitrarily enter and exit ranching. The arbitrariness in whether a farmer or rancher will remain comes not from which legal rule is in force, but from the assumption of zero rents and the resulting ambivalence profit-maximizing actors have in the outcome.

There is some unease in downplaying the situation of zero rents, for the standard model of competitive markets assumes that at least some firms earn zero rents. The Coase Theorem can be applied rigorously to competitive markets, as Robert Cooter has shown,[48] although the results are surprising. In particular, for a

48. Cooter, *supra* note 31.

competitive market in entitlements to reach optimal results requires a very smart government that knows the optimal number of entitlements to create.

More often the Coase Theorem is thought of as a theory of bargaining than a theory about competitive markets. The essence of bargaining is deciding how to create and divide surpluses (i.e., rents), or how to minimize and share losses. When gains and losses are nonexistent, parties have nothing to bargain over and bargaining theory becomes empty. Similarly, when either party earns zero rents alone but earn joint losses when acting together, a theory that bargainers will reach efficient bargains predicts that one party will drop out but does not predict which one will do so. One will stay and earn zero rents; the other will leave and earn zero rents. The identity of who leaves is irrelevant to efficiency (and to distribution). The parties have nothing to bargain over. The argument that the Coase Theorem as a theory of bargaining does not apply to parties earning zero rents says no more than parties do not bargain when there is nothing to bargain over. The Coase Theorem can live with such criticism.

IV. Conclusion

Posin's flying pig purports to present a plethora of pitfalls for the Coase Theorem: opportunity cost mirages, rate of return effects, wealth effects, zero rents. I have attempted to untwist the pig's tongue by carefully analyzing the claims. Nothing was there but a squeal. I hope some broader lessons were learned in the process.