

THE BLACK DEATH AND PROPERTY RIGHTS

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ABSTRACT

The Black Death visited unprecedented mortality rates on Europe, realigning relative values of factors of production, and in consequence the costs and benefits of defining and enforcing property rights. Our model refines the conceptual range of shared claims that exist between open access and private property, improving analysis of the postplague pattern and timing of abandonments and privatizations. Because of title enforcement costs, the decreased marginal value of nonhuman assets induced a lapse of some private claims, although communities continued to exploit a part of those resources informally as a commons. In contrast, the marginal value of labor and human capital rose, which placed insupportable stress on feudal institutions. The predictable evolution of workers' rights to their own labor accelerated the erosion of serfdom. The Black Death thus illustrates demographic change inducing evolutionary institutional change.

THE fingers of one hand count Europe's mid-fourteenth-century Black Death years. Given better data, one might view the sixth century's Plague of Justinian as a close rival, but the Black Death brought the highest continent-wide annual death rates ever reliably documented before or since. Although most regions lacked decent census data, chroniclers throughout Europe recorded exceedingly gruesome qualitative impressions. From scattered but relatively good English, French, and Italian demographics, scholars have extrapolated that overall one-quarter to one-third of the continent's population perished in half a decade, although in extreme instances some locales were utterly depopulated. Even J. C. Russell, a relatively conservative researcher, believed that excess mortality exceeded 15 percent.¹ A modern observer trying to gauge such horror finds little that is remotely comparable. At this

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¹ Josiah Cox Russell, *British Medieval Population* (1948). One of Russell's important corrections involved netting out those (approximately 3 percent per year) who would have died from other causes had the plague never reached Europe.

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time, similar death rates from AIDS have been isolated,² and death rate spikes during our most costly wars pale in contrast.³

The Black Death left nonhuman inputs virtually untouched; it therefore profoundly altered relative factor values.⁴ Labor and human capital rapidly became scarce relative to complementary nonhuman factors, while the other factors grew increasingly abundant per capita. To a notable degree, factor rewards are said to have atrophied at customary levels across the feudal centuries, but during the pestilence, shadow prices of human factors soared

² Over the past 2 decades, AIDS has killed roughly three-tenths of 1 percent of the world population, and the United Nations foresees a mortality rate of 1–2 percent of the world population over the next 20 years. Thomas H. Maugh II, *AIDS Fight Barely Begun*, Chi. Trib., July 3, 2002, § 1, at 3. Even in the most severely afflicted nations such as Botswana and Zimbabwe, the HIV-positive rate (not the percentage that have developed AIDS and certainly not the short-term mortality rate) now runs between 30 and 40 percent among adults and around 25 percent of the total population. See Maugh, *supra*; and Laurie Goering, *Africa Famine Threat Rises: UN Cites Politics, AIDS in 6 Nations*, Chi. Trib., September 18, 2002, § 1, at 6.

³ Two percent of the U.S. population perished during the 4 years of our Civil War. Ken Burns, *The Civil War* (Florentine Films 1995). Census figures from the various nations indicate that, in aggregate, World War II (WWII) killed between 3 and 4 percent of the combined populations of the belligerents, counting military and collateral civilian losses (including those of the Holocaust)—and that war afflicted Europe for a longer period than had the Black Death. Delayed entry into a conflict fought mainly abroad spared the United States appreciably during WWII, so U.S. excess mortality was perhaps one-tenth of the all-combatant average. Thus, percentage mortality across the whole of Europe during the Black Death might plausibly have been 12–15 times the deaths per capita during our Civil War and 100 times that experienced by the U.S. during WWII. Because the fourteenth-century population fell so far short of modern totals, percentage mortality figures obviously must be distinguished from absolute mortality. Even on a percentage basis, few other diseases, or the odd conquest or famine, have attacked subpopulations as relentlessly as the Black Death hammered Europe. Poland, a central theater throughout WWII and invaded first simultaneously and then sequentially by Germany and the Soviet Union, lost about 20 percent of the total population and more than 85 percent of its Jewish population. Steven Erlanger, *An Inquiry Confirms a Massacre of Jews by Poles in World War II*, N.Y. Times (national ed.), July 10, 2002, at A4. Irish mortality during the potato famine and Cambodian losses on the killing fields are claimed to have approached Black Death percentages. Several Western Hemisphere and Pacific Island tribes and the Tasmanian aborigines were literally exterminated following first contact with Eastern Hemisphere diseases. William Hardy McNeill, *Plagues and Peoples 176–207* (1976). The U.S. Civil War devastated fully a quarter of the military age male cohort of the Confederacy. The 1918–19 flu epidemic killed more than 6 percent of the population of British India, over 15 percent in the worst-hit regions. Theodore William Schultz, *Transforming Traditional Agriculture 64–65* (1964). Depopulation along the highways of the so-called AIDS corridor between the Cape and Cairo continues largely unabated.

⁴ Jack Hirshleifer, *Economic Behaviour in Adversity 96* (1987). Most researchers believe the Black Death was the bubonic plague (accompanied by its more deadly and contagious pneumonic form where the bacillus reached the victim's lungs before death or recovery). Plague is a rodent disease capable episodically of becoming epidemic (although not endemic) among humans but attacking few agriculturally important animals. Diseases attacking humans from loci in other species are reasonably common. For instance, the permanent reservoirs of influenza are among birds and swine, while the West Nile reservoir seems to be strictly avian. But influenza and West Nile can infect humans when contact with a reservoir is close, as for flu between Asian peasants and their numerous and proximate domesticated geese and ducks. AIDS is thought to be a simian disease that became endemic in the human population relatively recently. Since human outbreaks are so infrequent, the terrifying Ebola and Marburg infections must reside in some animal reservoir, although nobody knows where.

ever higher as those of nonafflicted factors plummeted.⁵ Because feudal factor prices were much stickier than modern ones, the economy became unbalanced, although initially the inexperienced survivors could barely envision the more comprehensive markets now required.⁶ Feudal society adapted poorly to rapid change, and the ensuing stress broke a great many medieval institutions.

I. THREE COMPETING MODELS

The great plague neatly pits three factor-adjustment models against each other—the noneconomist’s fixed-proportions model versus the economist’s standard variable-proportions model versus a property rights extension of the latter initiated by Armen Alchian and Harold Demsetz.⁷

A. *The (Nearly) Fixed-Proportions Model*

Many noneconomists imagine that fixed proportions tolerably approximates economic life. In a strict fixed-proportions model, a one-third reduction in the labor supply would lead to abandonment of one-third of complementary productive factors. Even granting a less rigid response, wherein harried Black Death survivors increased working hours and diligence, how could they have compensated for such massive mortality? It might seem natural that the survivors would abandon almost, if not quite, one-third of the arable land, the pastures, the homes, in brief, nearly one-third of everything. If that were true, it would be consistent with the economics of information⁸ if the claims

⁵ E. B. Fryde, Peasant Rebellion and Peasant Discontents, in 3 *The Agrarian History of England and Wales 744, 747* (Joan Thirsk ed. 1991); Hirshleifer, *supra* note 4, at 103–10; Helen Robbins, A Comparison of the Effects of the Black Death on the Economic Organization of France and England, 36 *J. Pol. Econ.* 463 (1928); Nathan Rosenberg & L. E. Birdzell, Jr., *How the West Grew Rich: The Economic Transformation of the Industrial World* (1986).

⁶ In the vanguard of social reaction in both England and France were price-control statutes—each nation enacted a Statute of Labourers that endeavored both to fix wages at preplague levels (or just slightly above in the case of France) and to forbid idleness. But in contrast to the creeping rot and misallocation of the housing stock occasioned by, for example, New York City and Santa Monica, California, rent controls, the imbalances in the latter fourteenth century were so extreme that the statutes had difficulty muting the impact of the pestilence on marginal prices and a constant, if feckless, tinkering with legal detail ensued. Some laborers (although apparently few employers) were fined or imprisoned for agreeing to or merely suggesting wage levels above the statutory maximum, and a few workers even died resisting the statutes. Robbins, *supra* note 5, at 474–76; Hirshleifer, *supra* note 4, at 104–5. There is controversy concerning the short-run effectiveness of the wage controls, but it seems clear that by the early years of the fifteenth century, following several revisitations of the plague, equilibrium real wages were half again those prevailing before the Black Death. David L. Farmer, *Prices and Wages, 1350–1500*, in Thirsk ed., *supra* note 5, 3:431, 3:485–86.

⁷ Armen A. Alchian, Some Economics of Property Rights, 30 *Il Politico* 816 (1965); Harold Demsetz, Toward a Theory of Property Rights, 57 *Am. Econ. Rev. Papers & Proc.* 347 (1967).

⁸ George J. Stigler, The Economics of Information, 69 *J. Pol. Econ.* 213 (1961).

on abandoned resources gradually faded from memory while claims on resources in continuing use were defended.

But one of the important lessons of economics points to the danger of neglecting the innovative compensations that people make in response to changes in economic magnitudes. To begin with a modern example, it would be disruptive if the United States awakened to discover an unexpected quadrupling of gasoline prices. A breathless media would see disaster looming, imagining that people would be unable even to travel to work or to the store. Any substantial vacation plans would seem doomed. But in fact the impact would lessen quickly as people dusted off bikes, hiking shoes, and bus schedules even as they increased the multitasking of automotive trips. As the existing stock of cars gradually depreciated, smaller automobiles would replace larger ones. Who knows what sorts of completely unforeseen innovations would be induced over time? In other words, people in the United States would begin to behave like Europeans, where gasoline is already four times as expensive as it is in the United States. Europeans regularly go shopping and to work (in trains and small cars and on bikes) and take vacation trips like clockwork.

In brief, fixed-proportions models omit (among other things) potential compensating changes in productive techniques. To return the discussion to the plague years, a few obvious compensations to adjust for the disappearance of so many workers would quickly have occurred to survivors. For example, those idled draft animals lucky enough to escape the table would quickly have been joined into enlarged teams, thus enabling a peasant to plow and haul more rapidly than before. Although previously a rare privilege rather than the norm, such large teams would have required no unknown technique. More subtle innovations would have continued for a substantial period, because idle resources provide a powerful spark to innovation.⁹

Even the haphazard medieval data that survive easily reject the fixed-proportions hypothesis, as will be shown below. Survivors soon began using human and nonhuman factors in unprecedented ratios, which resulted in a per capita real income spike unmatched again until the early modern period (although aggregate income fell for decades because of the radical population decline). Not everyone shared the bounty. The nobility, who had relied on the returns from land and capital to support elegance, promptly found it impossible to maintain their accustomed lifestyles. Any noble house in serious debt when the Black Death struck faced ruin.

B. The Standard Variable-Proportions Model

That record would surprise few economists, most of whom would expect that hardly any resources would have been abandoned. The marginal products

⁹ Joel Mokyr, *The Lever of Riches* 273–78 (1990).

of those nonhuman factors that were complementary to labor or human capital must have fallen in response to the sharp reduction in human factors, but why expect their owners to stop enforcing claims so long as the (net) marginal products remained positive? It would seem under that view that a positive marginal product must have disappeared wherever the documentary record reveals a failure to enforce prior claims. But then unenforced title must have meant that not just the claim but also the very utilization of the resource would have terminated.

This alternative to fixed proportions would thus foresee substantial change in the proportions with which factors were used, but little abandonment. A typical survivor would be expected to have acquired nearly half again as much land, draft power, capital, and so on. The means of producing a given product would have less intensively used the now more costly labor and human capital, substituting cheapened land, physical capital, and animal power instead.

Simultaneously, the product mix would have shifted toward less human-intensive products. To illustrate, following the epidemic both gardening and animal husbandry would have substituted land for labor, a prediction borne out by the widespread contemporary observation that fields and pastures became untidy after the pandemic, with weeds, sparse crops, and stray animals tolerated to an unprecedented degree while any crop that performed too poorly was simply neglected until it spoiled in the field: “[N]ow the fields begin to have a ragged appearance; crows, with no boy to scare them away, cry loudly over the meager grain in a sown arable strip while next to it weeds grow on other strips belonging to farmers who have reduced their own sown acreage, divisions between them becoming obliterated.”¹⁰

But there would also have been a substitution of the less labor-intensive animal husbandry for the more labor-intensive gardening.¹¹ The reduced value of the land input would have decreased the cost of pastoral production, and that in turn would have resulted in a decline in the price of animal products relative to other foodstuffs. Thus, while higher per capita incomes would have led to larger peasant meals generally (with a salutary impact on prior nutrition standards), a disproportionate part of that bounty would have come as meat and cheese rather than vegetables, the production of each consuming

¹⁰ Harold Fox, *The Wolds before c. 1500*, in *The English Rural Landscape* 50, 60 (Joan Thirsk ed. 2000).

¹¹ B. H. Slicher van Bath, *The Agrarian History of Western Europe, A.D. 500–1850*, at 142 (1963). If “labor works in conjunction with an abundance of complementary resources . . . the people are rich, although in consequence the productivity of the [other factors] is poor. . . . [With reversed factor ratios the other factors are] rich because so much labor can be applied to each unit, but in consequence the people are poor.” David D. Haddock, *Force, Threat, Negotiation: The Private Enforcement of Rights*, in *Property Rights: Contract, Conflict, and Law* 168, 192–93 (Terry L. Anderson & Fred S. McChesney eds. 2003).

less labor but more land. Similarly, terms of trade moved against land-intensive agriculture and in favor of labor-intensive manufactures.¹²

Variable proportions gives a much more satisfactory account of the historical record than does fixed proportions, but three puzzles remain. First—perhaps merely an untestable impression—the abandonment of effective resource claims seems to have been rather substantial, substantial enough to evoke widespread dismay in contemporary accounts. Second—a more telling difficulty—some of those resources nonetheless remained in use, although usually less intensively. Thus, net marginal products must sometimes have remained positive although effective enforcement of title ceased. Third—an error of omission—standard variable proportions (in company with fixed proportions) makes no prediction that particular resource entitlements will change hands, such as the decay of serfdom through which a great deal of human resource ownership was transferred from master to serf.

C. *The Property Rights Model*

Those puzzles arise not because economists use the variable-proportions model—indeed a powerful theoretical tool—but because the standard variant omits any coherent theory of property rights. In truth, the property rights model is not so much a competitor of the variable-proportions model as an extension. Standard economics takes initial resource ownership as given, a matter that seems mysteriously to have been solved before the model's analysis even began, and implicitly assumes that maintaining ownership is costless. In contrast, property rights economists begin analysis at an earlier point, asking how (and even if) ownership of a particular resource comes into being and analogously whether and when it will be abandoned.¹³ Excluding some people from a resource and governing the limits under which others may employ it are costly, although if no uses are barred, exploitation is apt to be too intensive and too early while simultaneously the resource's maintenance and enhancement are neglected. Claiming and enforcing title is indeed a powerful mechanism for reducing gross dissipation of rent, but it is net dissipation that is at issue. The gross dissipation avoided by establishing and maintaining resource title must exceed the consequent cost, or rational actors would not assert claims strong enough to exclude other users or uses.¹⁴

This cost of defining and maintaining property rights leads to situations in which a number of people who do not bother with formal claims simultaneously use some resource because the marginal product, although positive,

¹² Douglass Cecil North & Robert Paul Thomas, *The Rise of the Western World* 75 (1973).

¹³ The seminal works are by Alchian and by Demsetz, *supra* note 7.

¹⁴ For example, see Steven N. S. Cheung, *The Structure of a Contract and the Theory of a Non-exclusive Resource*, 13 *J. Law & Econ.* 49 (1970).

is inadequate to justify title formation and enforcement.¹⁵ There will be some dissipation, but it would be wasteful to avoid it. The efficient level of dissipation will be trivial if the cost of controlling it is minor, but substantial if control cost is high. It follows that changes in either the physical dissipation of a resource's marginal product or of its market value will predictably alter property rights, as will changes in the technology of property control or the cost of the inputs required to employ it. As Demsetz noted, resource ownership is not a given and it certainly is not costless.¹⁶ Thus, unlike either of its competitors, the variable-proportions variant that incorporates property rights insights—the property rights model—is consistent with some post-Black Death failure to enforce title even though the resource remained in use. Such abandonment of exclusive claims would have occurred where the marginal product was positive but too low to justify defending title.

Again, in distinction to its competitors, the property rights model also predicts that the Black Death would have put substantial stress on feudal institutions, notably serfdom. To see why, note that few medieval workers owned a really substantial share of their own labor.¹⁷ Instead, most were bound to some petty lord through one of several distinct degrees of serfdom, with the serf and the lord holding some traditional division of rights to the serf's labor. Except for that minority of serfs directly in bondage to the king, the lord in turn would have had feudal obligations to an overlord, who could within traditional limits claim resources from those directly beneath him in the hierarchy.¹⁸ Thus the overlord had a limited if indirect claim on the lord's limited claim over a serf's labor. That overlord (unless he were king) would have had an even more exalted superior with analogous rights, and so on. Feudal relations thus resulted in a chain of increasingly indirect claims on serf labor beginning with the serf and ending with the king. That claim dispersal meant each semi-owner (including the serf) had an incentive to use an individual right in ways that diminished the long-run value aggregated over all the rights holders.

Consider choices regarding risk. During any claiming period, a decision maker might have used a serf in ways (such as collecting bird eggs from cliff-side nests) that as a statistical expectation advantaged the decision maker while injuring the aggregated group of claimants. The entire payoff if the activity was successful (namely, the serf did not fall but brought back eggs)

¹⁵ Lee J. Alston, Gary D. Libecap, & Bernardo Mueller, *Titles, Conflict, and Land Use: The Development of Property Rights and Land Reform on the Brazilian Amazon Frontier* (1999).

¹⁶ Demsetz, *supra* note 7.

¹⁷ Indeed, even today one possesses incomplete title. If it can tax, a government asserts some claim over the returns to all factors, including the human. It is a matter of degree.

¹⁸ We adopt the masculine pronoun here because lords and their overlords all the way to the sovereign were predominantly, although not quite exclusively, male. A similar tendency was clearly absent in the instance of serfs, where the populations divided by gender would have been roughly equal.

would have accrued to the decision maker, whereas the cost of a mishap would have been shared (all claimants would have lost an anticipated portion of an injured or killed serf's labor). The wholly private marginal benefit would have been brought into equality with marginal private cost, thus omitting the marginal external cost to others who shared claims on the serf's labor. Too much risk would consequently have been undertaken.¹⁹

Importantly, the value of that dissipation would have been less when labor's marginal product was low, and then it would not have warranted as substantial an avoidance cost. But as post-Black Death labor scarcity increased the marginal product of human factors, bearing additional costs to reduce the dissipation of labor rents would have become increasingly attractive. How might that be done? To answer, it is informative to consider first a nonhuman factor, then to observe the modifications that become apparent if the factor's nature is altered.

Imagine that parties A, B, C, . . . , N shared ownership of some tool, perhaps a plow. That ownership structure would lead to some dissipation of the physical marginal product of the plow—in order to cover more ground while in possession a co-owner might use the tool roughly, too little postuse cleaning might encourage rust, and so on. If an hour's worth of plow time becomes more valuable, such dissipation will become more important to the owners. Marginal dissipation that had been tolerable owing to its low value relative to control cost would perhaps become wasteful after the value of the marginal product increased. Internalizing more externalities can reduce that dissipation (the benefit), and one way to internalize externalities is to consolidate ownership, although that will increase spot transactions or other adjustments (the cost) necessary to control the plow's idleness. But if ownership is consolidated, it is hardly obvious whether it will consolidate in the hands of A or B or C or . . . N. There is inadequate information in the hypothetical to resolve that issue.

If we substitute a serf for a plow, however, the likely consolidation becomes clearer. By the nature of the resource, it is difficult to divorce human productive factors from the willful humans who embody them. A plow has no preferences regarding its own use patterns, nor can it monitor itself, but human factors do have such preferences, and they can monitor their own behavior. Humans shirk, they sneak, they secretly divert toward themselves returns that rightly belong to another. Linguistic study shows that the modern term villain derives directly from a Middle English term meaning serf—villein—but the stolid plow never behaves in villainous ways.

Monitoring a worker is often less costly for the worker—who in any event

¹⁹ Since the number of distinct claimants would have been fewer and thus the externality less pervasive, an implication (untested here) is that there would have been less dissipation of labor value for serfs directly in bondage to a king than for those in bondage to a baron, and so on, down to a serf in bondage to the most petty lord.

must attend to the task—than for another claimant, whose only motivation for being present is to monitor the worker.²⁰ More subtly, the worker is able to gauge the subjective costs and benefits of exerting alternative levels of effort, often a main part of the equation. Even a monitor who could perfectly observe the objective characteristics of what a worker is doing would have a harder time optimizing the effort than would the worker, because the subjective costs and benefits to the worker would be unobservable by the monitor. Consequently, as the value of human factors increases, the dissipation arising from external control of the worker increases and, *ceteris paribus*, the advantage of consolidating ownership in the worker's hands grows.²¹

Although lords retained some claim over a serf's labor, converting in-kind obligations into monetary ones—taxes—increased the worker's residual claim on labor value and therefore the incentive to maximize it. That conversion was slowed as it awaited reasonably thoroughgoing markets where the monetary claims could be smoothly substituted for in-kind exactions.²² Although each of those changes had begun prior to the Black Death (possibly owing to unrelated famines earlier in the fourteenth century), they greatly accelerated afterward.

Although there was legislative resistance to increasing serfs' claims on their own labor, manifested for instance in the Statute of Labourers, the dispersed claims gradually concentrated in the workers' hands as labor became increasingly scarce. To be sure, the flow of a free worker's labor was sold when the worker hired out. But once the chains of serfdom were released, the worker could refuse any offer that would reduce labor value, just as an employer would refuse to tender an offer if the worker could not be adequately monitored.

In contrast to human factors, as the relative value of nonhuman factors decreased, it became less attractive to avoid dissipating them. Put more intuitively, as factors like land became less valuable, it became more attractive to reduce the cost of closely patrolling the borders along with similar property defenses. Decision makers balanced dissipation of one productive resource against the opportunity cost of factors consumed to protect it. One would predict equality at the margin, meaning that neither form of dissipation would be eradicated, but instead the aggregate magnitude of the two would be minimized.

The property rights model would thus argue for post-Black Death evolution of more strongly protected connections between decision maker and

²⁰ Yoram Barzel, *The Entrepreneur's Reward for Self-Policing*, 25 *Econ. Inquiry* 103 (1987).

²¹ Yoram Barzel, *An Economic Analysis of Slavery*, 20 *J. Law & Econ.* 87 (1977).

²² North & Thomas, *supra* note 12. Government exactions imposed on income earned from time spent at labor create well-known distortions, but, holding constant the benefits accruing to the government, the level of distortion arising from government exactions of the time itself would be greater because the government would make poorer choices regarding the alternatives the worker would have to sacrifice.

residual claimant for human factors, but weaker ones for nonhuman factors, holding constant the technology available for curtailing dissipation. On account of the disaster's very magnitude, the Black Death would predictably have caused a substantial and diverse upheaval in medieval property rights.

II. THE BLACK DEATH

Although the pestilence created havoc among European rodent populations, including game such as squirrels, it seems to have little affected domestic animals other than rabbits and (some claim) cats, although a concurrent anthrax epidemic killed a number of cattle and surely contributed to the human toll. Thus, while land and physical capital were untouched by the Black Death and the drain on the animal population was muted, human casualties were staggering. The resulting massive factor proportions disruption created strong evolutionary pressures on property rights definition and enforcement. A feudal society that had long allocated many inputs and outputs by traditional obligation was profoundly challenged. It took time for institutions—new techniques and new markets—to evolve through learning by doing, but once they had, Europe started on a trajectory toward its modern incarnation.

Speakers of European languages recall the plague (if at all) solely from its impact on that continent. But the pestilence had raged in Asia for at least 15 years before a Genoese ship inbound from the Black Sea brought the disease to Sicily late in 1347. The epidemic was a disaster without documented antecedent across the entire Eastern Hemisphere. No subsequent war, famine, or disease has engulfed such a vast region with such terrible mortality.²³

The Black Death first appeared in east or southeast Asia in the early 1330s, moved westward at a measured pace along caravan routes traversing central Asia, then quickly spread across Europe and Africa.²⁴ Epidemics recurred every decade or two for centuries. England's population did not regain pre-

²³ As discussed in note 3 *supra*, a few other diseases, conquests, and famines have attacked subpopulations as relentlessly as the Black Death did the Eastern Hemisphere. But none of those tragedies approached the Black Death's geographic span.

²⁴ Most scholars argue that the Black Death resulted from bubonic plague bacilli jumping opportunistically to humans from an endemic infection within some unidentified burrowing rodent population (perhaps marmots) with no proclivity to live near humans. The plague remains endemic among many burrowing rodent populations, and occasionally humans become infected, although since the mid-twentieth century, plague has been treatable if diagnosed early. Minority viewpoints note that prior to rapid modern transport, well-documented plague epidemics usually moved glacially across space, not with the astounding speed of the Black Death once it reached Europe, arguing on that basis that some different infection (such as anthrax) was at the true root of the Black Death. For our purposes, it is sufficient that the disease, whatever it was, resulted in rapid, widespread, and massive human mortality and that the effects persisted for a very long time, matters that no scholar disputes.

plague numbers for a quarter of a millennium²⁵—roughly until her people began to settle in North America—and remained under long-run trend for many additional decades. Local populations like Greenland’s Norse could be utterly annihilated, while others, such as the Milanese, went virtually untouched. In general, experiences among proximate locales were highly variable.

During the first epidemic, the infected third who survived were disproportionately the relatively strong—late adolescents and young adults—who then became immune. Even so, the mortality rate among prime-age labor force participants was substantial, perhaps half that among children and the elderly. Subsequent outbreaks became known as “children’s plagues” because of the noticeably higher mortality among that previously unexposed population. By carrying off a larger portion of the mature working population than did later visitations, the initial epidemic of the mid-1300s delivered the more substantial blow to factor proportions.

The wealthy seemed to have a better chance of cheating death because of their generally superior health and mobility, but excess mortality was hardly restricted to the poor. England’s Princess Joan succumbed en route to wed the Castilian Prince Pedro, creating an international crisis regarding the vesting of a dowry that included sovereignty over specified regions. Having defied an order to return to the relative safety of the capital, the most able Muslim general of the day died in the field. The new archbishop of Canterbury hardly had time to settle into office before being called to his maker. And the death rate in Oxford halted classes for a time (whether the university’s students thought that a good or bad thing in net was not recorded). Thus human capital was also substantially affected, although less severely than raw labor.

Although institutions (including property rights) change slowly, recurring plague epidemics sapped labor for centuries, which provided economies ample time to adjust to the new factor proportions. Because the disease repeatedly struck the entire Eastern Hemisphere, there was limited opportunity for factor movements to mitigate the disruption, although substantial regional variation during any one epidemic led to unprecedented local migration, thus unsettling traditional, informal mechanisms of social control among neighbors as itinerants became common.

Such features set the Black Death apart from other events as a means of testing the property rights model. For instance, the few wars that have been long-lived (such as the Hundred Years War, which coincidentally was in its infancy as the Black Death struck) have been relatively local with usually moderate casualty rates, while those that have been widespread or intense have ended after a few months or years. Further, wars often consume other factors (especially physical capital) at a similar or even greater pace than they destroy labor and human capital. Property rights institutions cannot react

²⁵ Russell, *supra* note 1, at 248–70.

promptly enough to compensate much for the impact of widespread but relatively brief wars, while factor migration ameliorates the impact of localized ones.

Similar statements apply to most alternative epidemics, even AIDS. Although AIDS has inflicted terrible mortality, soon after its identification scientists decoded its principal means of transmission and thus learned how to greatly reduce the likelihood of contracting it. At present, the treatment of AIDS and its precursor HIV are expensive and ineffective, but avoidance of initial infection is both cheap and effective. As that knowledge spreads, the AIDS devastation will recede among populations that adopt appropriate social habits. Recession of the disease is underway in most economically advanced nations, although poor education levels and counterproductive sexual traditions have retarded containment elsewhere. That is in marked contrast to the bubonic plague, for which the mechanism of transmission was established only in the late 1800s, half a millennium after the disease's best-known attack on humans.

Thus, the Black Death shattered customary factor proportions throughout the Eastern Hemisphere. In the next section, we focus more carefully on the implications of that revolution for the institutions of property rights, returning in Section V to contrast them with those of fixed and variable proportions. The competing implications are then held against surviving western European data.

III. THE NATURE OF PROPERTY RIGHTS

When economists first began to study the evolution of property rights and contemplate their impact on dissipation of resource value, the initial models understandably assumed away many relationships in order to illuminate regularities among a few of the most important ones. The initial models contrasted polar cases—resources that were completely owned with those that were entirely unowned. Unfortunately, an inappropriate and misleading term—commons—was adopted to signify the antonym of completely private. What was called a commons in medieval times hardly permitted access by everyone at all times for any use. There were rules governing a commons that defined who could exploit it and how. Beyond the commons were other areas that nobody made much effort to control and that could therefore be used by anyone for whatever purposes they desired. The latter regions we term places of open access.

Eventually, scholars began to notice that although few properties are completely private, a great number fall well short of open access, being shared across a range of intermediate forms with greater or lesser internal control—within a village, feudal system, family, kibbutz, or some less formal

agglomeration.²⁶ The latter accord more closely with a medieval commons, so to avoid confusing the quite distinct concepts to which “commons” has been applied in the literature we follow Louis DeAlessi’s²⁷ terminology of open access (an endpoint) versus communal property (a continuously variable multidimensional intermediate class that would have included, among other things, the medieval commons) versus private property (the opposite endpoint). Feudal labor, in other words, was communal property shared according to evolved convention by serf, lord, and a chain of overlords extending to the sovereign. The term “commons,” then, becomes the union of all forms other than strictly private, thus encompassing all the different ways that it has been used in the literature.

Under our taxonomy, Garrett Hardin’s famous lament²⁸ should have been entitled “The Tragedy of Open Access.” But Demsetz’s conjecture regarding property rights formation²⁹—which just predated Hardin’s—actually implies a potential tragedy in avoiding the tragedy of open access. Avoiding Hardin’s tragedy of open access could cost more than does the “tragedy” itself.

In contrast to many earlier works in property rights economics, only rarely is our focus on either open-access resources or complete private ownership. Instead, we argue that most valuable resources are in a real sense shared to a greater or lesser extent, and instead of focusing on movements of resources from taxonomic class to taxonomic class, we focus on the continuous ways that entitlements vary within communal property. Our starting point is Demsetz,³⁰ but as augmented by the work of a number of scholars, most pointedly that of Barry C. Field³¹ and Elinor Ostrom,³² which drew the focus onto the continuous ways that entitlements can vary within communal property. Along our continuum of rights between purely private ownership and complete open access, our conjecture predicts that nonhuman resources would have moved away from the private end after the Black Death and thus toward (although

²⁶ Alston, Libecap, & Mueller, *supra* note 15; Steven N. S. Cheung, *The Theory of Share Tenancy* (1969); Thráinn Eggertsson, *Economic Behavior and Institutions* (1990); Barry C. Field, *The Optimal Commons*, 67 *Am. J. Agric. Econ.* 364 (1985); Dean Lueck, *Ownership and Regulation of Wildlife*, 29 *Econ. Inquiry* 249 (1991); North & Thomas, *supra* note 12; Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (1990); and Henry E. Smith, *Semicommon Property Rights and Scattering in the Open Fields*, 29 *J. Legal Stud.* 131 (2000). In *The Evolution of Property Rights*, 42 *Kyklos* 319 (1989), Barry Field simplified his 1985 article but unfortunately removed explicit consideration of the benefits of exclusion and governance, focusing exclusively on cost minimization for a given level of rent dissipation. A matter of central interest for understanding the Black Death’s property rights implications thus became submerged.

²⁷ Louis DeAlessi, *Gains from Private Property: The Empirical Evidence*, in Anderson & McChesney eds., *supra* note 11, at 90.

²⁸ Garrett Hardin, *The Tragedy of the Commons*, 162 *Science* 124 (1968).

²⁹ Demsetz, *supra* note 7.

³⁰ *Id.*

³¹ Field, *Optimal Commons*, *supra* note 26.

³² Ostrom, *supra* note 26.

not always to) open access. Human resources, in contrast, would have moved toward the private end.

A. *Why Do Property Rights Matter?*

So many private resources, so many resentful people. Why not permit open access so that each person can reap what and as much as is needed without selfishly excluding others from that same privilege? In a very real sense that is the primordial economic question, but to many modern economists its answer seems too obvious to state, while to many noneconomists it seems that it could have no coherent answer. From the perspective of a property rights economist, the question's answer forms the basis from which all economic theory builds.

First, for those assets that economists call private, use by one individual precludes simultaneous use by another.³³ If multiple people are considered legitimate potential users at each moment, costly competition is apt to result,³⁴ often referred to as the racing problem.³⁵ Then inputs are expended solely to capture the flow of returns before other entitled users can.³⁶ The resources expended in the competition, the value of which under some circumstances can equal or even exceed that of the disputed resource, could have gone to produce additional useful things, but instead served only to contest control of something that would exist anyway.

³³ A private good (such as a stadium seat that cannot simultaneously be used by multiple people—"the public" as it were) and a public good (such as a radio program that can be used by all and sundry without depreciating anyone's enjoyment) refer to consumption, not to ownership or supply. A public body—a government—need not be involved in any way with most public goods, nor must private goods eschew government involvement. Many public goods are provided by private entities (most radio programs in the United States, for example), while governments often provide private goods (such as seats in sports stadiums). Some who understand the inessential nature of the supply-side and ownership connections nonetheless expect a public body to provide more appropriate levels of public goods (for example, see Robert Cooter & Thomas Ulen, *Law and Economics* 100–103 (2d ed. 1997)). That belief was challenged by R. H. Coase, *British Broadcasting: A Study in Monopoly* (1950), and has come under continuous attack since public choice theory emerged. See James M. Buchanan & Gordon Tullock, *The Calculus of Consent: Logical Foundations of Constitutional Democracy* (1962); Gordon Tullock, *The Welfare Costs of Tariffs, Monopolies, and Theft*, 5 *W. Econ. J.* 224 (1967); George J. Stigler, *The Theory of Economic Regulation*, 2 *Bell J. Econ.* 3 (1971); Fred S. McChesney, *Money for Nothing: Politicians, Rent Extraction, and Political Extortion* (1997); Fred S. McChesney, *Government as Definer of Property Rights: Tragedy Exiting the Commons?* in Anderson & McChesney eds., *supra* note 11, at 227.

³⁴ Yoram Barzel, *Optimal Timing of Innovations*, 50 *Rev. Econ. & Stat.* 348 (1968); and Partha Dasgupta & Joseph E. Stiglitz, *Uncertainty, Industrial Structure, and the Speed of R&D*, 11 *Bell J. Econ.* 1 (1980).

³⁵ Dale T. Mortensen, *Property Rights in Mating, Racing, and Related Games*, 72 *Am. Econ. Rev.* 968 (1982).

³⁶ Apparently, a careful analysis of the problem appeared in Danish as early as 1911, but readership was limited prior to a recent translation. See Peder Andersen, *On Rent of Fishing Grounds: A Translation of Jens Warming's 1911 Article, with an Introduction*, 15 *Hist. Pol. Econ.* 391 (1983).

But in cases where one party's use precludes another's, what ensures that greater values will dominate lesser ones? That is the allocation problem. Private rights to private goods encourage movement of resources from lesser values to greater ones by facilitating exchanges—one party offers to give up a right that the party values by less in exchange for a right that that party values by more. If another party places different relative values on those rights, an exchange can rectify the initial misallocation and leave each party better off, providing transaction cost is less than the potential gain from trade. That mutual gain from trade would exist whether or not one of the parties placed a higher absolute value on both rights (a supposition that would be difficult to confirm, even by the parties themselves, because of our inability to gauge interpersonal utilities). So impeding the purchase of rights from desperate, poor people injures even the poor, a lesson that many commentators find difficult to grasp—wishing fecklessly that the poor received better terms hardly justifies forbidding them to receive any profit at all. The missed distinction is between the relative value of two rights as judged by either party rather than the absolute value of either right as judged by the two parties.

Further, poorly defined rights increase transaction cost, which could be rendered prohibitive. Take the example of two competing uses of some plot—he wants to construct a tennis court because the nearest one is a block away, she wants to raise a garden to stave off starvation. Insisting that the plot be open access should exacerbate concern for the starving gardener rather than ameliorating it—her gardening will be unproductive if he plays tennis on the growing plants as his enjoyment is diminished by unpredictable bounces resulting from cultivation. With prohibitive transaction cost, a likely result if open access were compelled, disentangling those conflicting uses would prove hopeless. So the gardener starves! Rather than imply that there should be no owner, concerns about allocation and transaction cost mean instead that there is a benefit (although also a cost) to contemplating which party would be the appropriate owner.³⁷

As measured by willingness to pay, a wealthy idler may value a tennis court more than a starving person values a garden, which strikes many as an inequity. But of what benefit to the gardener is slaving over plants that can by right be trampled or even harvested by the idler? It would seem best to sever wealth distribution concerns—the plot owner's identity—from the issue of whether there is to be an owner at all. If the plot has an owner, the resource can be used for some beneficial purpose whether or not Pareto-improving exchange ensures that it is the best use (however that is judged). If the starving gardener happens to be designated the plot's owner, her poor

³⁷ R. H. Coase, *The Problem of Social Cost*, 3 *J. Law & Econ.* 1 (1960). Because there are both costs and benefits, optimality will not lead to Nirvana, or perfection. See Harold Demsetz, *Information and Efficiency: Another Viewpoint*, 12 *J. Law & Econ.* 1 (1969).

situation is at least better than under open access even if because of high transactions cost she cannot sell to the idler, better yet if she voluntarily can and does sell.³⁸

And finally, nature rarely provides goods (public or private) in finished form and assets deteriorate unless maintained. Creation and maintenance ordinarily require personal sacrifice, acts that become rare unless use rights accrue to the sacrificing party. Less creation and maintenance today mean a less asset-rich world tomorrow. Then, in aggregate for certain, and possibly for each individual, the economy is a poorer one—the investment problem. That problem becomes especially vexing if one ponders the long-run fate of family lines rather than the experience only of individuals living through a privatization decision. Since in aggregate investments and labor are complements, compounding benefits over even a few generations might make nearly every family line a beneficiary of privatization.

Those rather compelling answers to the initial puzzle—Why does anyone own anything to the exclusion of others?—suggested its inverse—Why are any valuable assets in open access? Although the wasteful outcomes just catalogued could be ameliorated if title were vested in an individual, many resources remain unowned. Indeed, hardly anything is fully owned. Take your home for instance—home ownership includes no right to forbid invasion by neighbors' reasonable noises and cooking odors. To that extent (and more) your home is communal property in which neighbors have some rights, although substantially fewer than yours.

Worrisome examples of valuable but unowned and persistently dissipated resources are seen in many fisheries.³⁹ Nobody owns deep-sea fish until they are caught. Consequently, people waste resources racing to catch fish ahead of competitors—resources that could be conserved while catching the same quantity of fish if pursuit were less frantic. Less efficient enterprises persist because a transfer of future rights to uncaught fish is not credible—a different operation, a stranger to the contract, could unilaterally deprive the buyer of the purchased share.⁴⁰ Even in stressed fisheries, juveniles and fertile females are eaten along with the rest—another fisher would usually capture the benefit of any such fish that were released to grow or breed. So for decades the economist's plea rang out—privatize the fisheries! Yet movement in that

³⁸ The statement assumes that the gardener knows her interests better than do academic scribblers, politicians, or government bureaucrats, few of whom (if any) have even met her. Some scribblers, politicians, and bureaucrats think that is a strong assumption, but starving gardeners should not agree.

³⁹ H. Scott Gordon, *The Economic Theory of a Common-Property Resource: The Fishery*, 62 *J. Pol. Econ.* 124 (1954); and Anthony D. Scott, *The Fishery: The Objectives of Sole Ownership*, 63 *J. Pol. Econ.* 116 (1955).

⁴⁰ Indeed, when a resource stock is in open access, sale of the right of capture or even of the captured flow often is forbidden. By truncating the incentive of especially able competitors, forbidding the sale of the right or of the flow may actually mitigate overexploitation of an open-access resource. Lueck, *supra* note 26.

direction was (and is) glacial. Are policy makers illiterate, or are they just fools?

B. The Demsetz Model of Property Rights

In 1967, Harold Demsetz⁴¹ answered that question—“probably neither.” Some valuable resources are open access because it would be senseless that they be private just then. Privatization might indeed confer benefits but would also entail costs. The definition, enforcement, and governance of entitlements would be wasteful when and where costs exceed benefits. Those Demsetz costs can be divided into a capital cost of establishing initial claims versus a marginal cost of defending and governing established claims for additional periods.

Well understood in other applications, the distinction between capital and marginal cost is also important for understanding the evolution of property rights definition and enforcement. Little of the intangible capital imbedded in claim establishment can be salvaged and turned to any alternative use. But unsalvageable capital costs are not opportunity costs. As in other areas of economic life, sunk capital—title in this instance—would be retained providing the return net of the marginal cost of maintaining the claim remained positive, even though that might fall short of a normal return on the initial investment in title formation. A higher barrier must be crossed before an initial claim would be established, however, because *ex ante* no capital has been sunk. At that point, although they may ultimately be disappointed, potential claimants must expect benefits adequate not only to cover the marginal cost of maintaining a claim but also to provide a normal return on the risky intangible capital of claim establishment.

Thus, one would anticipate that privatization and abandonment would have been asymmetrical in the fourteenth century (as at present), with only relatively substantial claims established before the pestilence but only relatively insubstantial ones abandoned afterward. Still, because the pandemic led to such significant declines in the value of most nonhuman factors, the present value of at least some claims must have made that transition. As in the standard variable-proportions model, in the subset of transitions where long-run rents utterly disappeared, the resource would both have become unclaimed and fallen into disuse. However, in distinction to the standard model, disorganized exploitation of now open-access resources might continue in a property rights model if rents, although positive, could not cover the cost of continuing to assert title.

The capital costs can be subdivided. For instance, there is a cost of defining a property that is to be claimed. That cost may be minor if assets are stable and claims small—perhaps the surface rights to a few acres of plains could

⁴¹ Demsetz, *supra* note 7.

clearly be demarcated by easily noticed stones at the corners. But definition can be daunting; for example, what claim solves the deep-sea fishing problem? If a territorial claim, how on the trackless oceans will borders be recognized by fisherfolk and the fish kept within? If particular fish stocks are claimed, how will they be kept from mingling with those owned by others so that inadvertent capture as well as rustling can be controlled cheaply? If a single party owns an entire species, how will the deadweight loss of monopoly be avoided?

Holding the benefits of privatization constant, the Demsetz framework would seem to imply that similar productive resource attributes would more readily be privatized on a plain than in mountains because of differences in costs of property rights definition. Similarly, attributes of land of every sort would be more readily privatized than analogous ones in the ocean. All else equal, misuse of mountain forests will predictably be a more tractable problem than overfishing but less tractable than farmland erosion. Further, privatization both of mountains and of fish could converge on that of the plains with (for example) improved geopositioning satellites, an innovation that makes boundary definition less expensive everywhere.⁴² So the Demsetz conjecture is a dynamic one—what resources are sensibly private varies geographically and historically with costs and benefits.

A more subtle capital cost attributable to privatization arises from the rent-seeking struggle over ownership. So long as a fishery is open access, new enterprises enter until at the margin the fishery's economic rents are exhausted. Subsequently, input owners have little incentive to vie for access because they can do as well in alternative activities. But if the fishery may be privatized, whoever becomes the owner can curtail overfishing and maximize the property's rents. The average return to complementary inputs used in the fishery would now exceed the marginal return to similar inputs that will have to be forced into other pursuits, with the difference captured by the fishery's emergent owner. Thus, with privatization a costly struggle over ownership can easily emerge, and the entire potential rent of the property (in some cases even more!) might be dissipated through competition over title.⁴³

⁴² Because demarcation costs are strictly nonnegative, the maximum possible improvement is less on the plains, where those costs are already low, so geopositioning satellites will offer relatively less improvement there.

⁴³ Terry L. Anderson & Peter J. Hill, *Privatizing the Commons: An Improvement?* 50 *S. Econ. J.* 438 (1983); Terry L. Anderson & Peter J. Hill, *The Race for Property Rights*, 33 *J. Law & Econ.* 177 (1990); Barzel, *supra* note 34; Dasgupta & Stiglitz, *supra* note 34; David D. Haddock, *First Possession versus Optimal Timing: Limiting the Dissipation of Economic Value*, 64 *Wash. U. L. Q.* 775 (1986); Dale T. Mortensen, *supra* note 35; Gordon Tullock, *supra* note 33. If alternative potential owners have different abilities to exploit a property, under some circumstances the most skillful will be able to claim the resource at an appropriate time and in an appropriate manner unencumbered by competition from the less skillful, and rent-seeking dissipation by that route would pose little problem. Dean Lueck, *The Rule of First*

C. *Neither Beast nor Fowl: Communal Property*

Because physical properties have multiple simultaneous uses that utilize a range of scales, nearly any resource is communal in some sense with a more or less limited group jointly owning some typically diverse rights. Some of the uses are completely private—an unmarried and childless individual has an uncontested entitlement to watch a television in a windowless basement, while the neighboring family cannot watch that same set without prior arrangement. The neighbors are, however, entitled to create a reasonable level of noise during a family reunion on their own property even though that noise incidentally invades the neighboring home, just as the neighbor's reasonable noise invades theirs. Hence the two abutting property owners (and other nearby neighbors along with somewhat more distant farmers and construction companies accompanied by still more distant airliners and so on) share communally the "noise capacity" of the properties. Ordinarily, no noise will be tolerated to enter an individual's home if it originates at a family reunion 3 miles away—the communal set is limited.

To enforce those various rights, an individual must bear two distinct types of marginal cost. There is a governance cost relating to management of the attribute within the communal group. Even if control were costless, the ideal would not be to eradicate noise but to limit it so that more is generated only if the marginal benefit to the noisemaker exceeds the marginal cost to incidental listeners. So governance of communal entitlements incorporates essential elements of Guido Calabresi and A. Douglas Melamed's⁴⁴ liability rule of protection where the goal is to optimize the level of the externality.⁴⁵ Of course, control will not be costless, so the optimal level of noise will deviate from the ideal to a greater or lesser extent.⁴⁶ Governing communal noise levels might merely require friendly and pleasant conversation over the back fence and thus approach the ideal. With more numerous or more

Possession and the Design of the Law, 38 J. Law & Econ. 393 (1995). That result will ensue only with substantial heterogeneity of claiming abilities in the distribution's upper tail—if even a handful of the most skillful claimants are of similar ability, they will compete excessively for the property even though the vast majority of people pose no threat to them. More subtly, the most skillful potential claimant must recognize that heterogeneity to avoid a needless race in which there is no challenger. Dissipation may similarly reemerge at a prior stage if the heterogeneity of relevant attributes is endogenous. In that instance, people will race to become heterogeneous in ways that will benefit the investor when some new potentially valuable resource comes into view. Dean Lueck, First Possession as the Basis of Property, in Anderson & McChesney eds., *supra* note 11, at 200.

⁴⁴ Guido Calabresi & A. Douglas Melamed, Property Rules, Liability Rules, and Inalienability: One View of the Cathedral, 85 Harv. L. Rev. 1089 (1972).

⁴⁵ David D. Haddock, Fred S. McChesney, & Menahem Spiegel, An Ordinary Economic Rationale for Extraordinary Legal Sanctions, 78 Cal. L. Rev. 1 (1990).

⁴⁶ See Demsetz, *supra* note 37.

difficult neighbors, the governance cost would be higher and the deviation between optimal and ideal greater.⁴⁷

Distinct from governance cost, the individual bears an exclusion cost relating to noise potentially emanating from family reunions 3 miles away. Exclusion incorporates Calabresi and Melamed's⁴⁸ property rule of protection, where the costless ideal would be eradicating the noise. Again, the optimum will not be ideal but will take account of cost, so exclusion of nonowners will not be comprehensive. Although legal institutions may evolve to reduce the cost of informing others of exclusionary entitlements,⁴⁹ those costs will not be eradicated. Exclusion costs appear because people must be informed when a resource is no longer in open access and their exploitation has been discontinued. That imposes an ongoing cost if individuals forget or change across generations or through migration. It becomes necessary to ensure that those informed respect the claim or that property remains functionally open access. All else equal, the more costly it is to exclude nonowners, the greater will be the deviation between the ideal and the optimal.

Notice that we model governance and exclusion as distinct concepts, and thus our approach analyzes a different set of Demsetzian issues than does the approach of Henry Smith,⁵⁰ whose model treats governance and exclusion as opposite endpoints on a continuum. In our model, it is possible simultaneously to increase (decrease) both governance and exclusion. The function of governance in our model is to control prisoners' dilemmas relating to excessive or premature use and underinvestment or excessive depreciation of the base resource. An increase in governance would imply more fine-grained customs or rules constraining those who are entitled to use communal property, all of whom could possibly share the benefit resulting from reduced dissipation. In contrast, increased exclusion would imply a more thoroughgoing expulsion of those without any entitlement over the property. The communal owners might benefit from that, but those expelled would be injured. In brief, changes in governance could reflect Pareto improvements, but changes in exclusion can at best reflect Kaldor-Hicks improvements.

The Demsetz conjecture posits a straightforward dynamic cost-benefit comparison: The likelihood that a resource will be withdrawn from open access increases as the present value of the benefit of privatization rises or the present value of the sum of capital and marginal costs fall. Conversely, the likelihood that a resource will revert to a status open for all users and

⁴⁷ Robert C. Ellickson, *Property in Land*, 102 *Yale L. J.* 1315 (1993).

⁴⁸ Calabresi & Melamed, *supra* note 44.

⁴⁹ Thomas W. Merrill & Henry E. Smith, *The Property/Contract Interface*, 101 *Colum. L. Rev.* 773 (2001).

⁵⁰ Henry E. Smith, *Exclusion versus Governance: Two Strategies for Delineating Property Rights*, in this issue, at S453.

all uses increases as the benefit falls or the marginal cost rises.⁵¹ Admittedly, much of the resource rent can be dissipated when resources are open access, but that outcome is meaningful only in comparison to the cost of avoiding it—small dissipations dominate big ones.

D. *Governance of Communal Property or Exclusion?*

As Field and Ostrom emphasized, neither a right nor a bundle of rights need transform directly from open access, where exploitation by everyone in any way or time is permitted, to completely private, where one party possesses unabridged control.⁵² Much family property, for instance, is held communally among its members, with nonmembers regularly excluded. Meddlesome children, notoriously difficult to bar, impose irritating but limited overuse on things like clean dishes, but it is usually too costly to establish and enforce completely private rights over individual items of crockery. Passersby, in contrast, are barred from using the family dishes without permission. And even the family members will be expected to abide by certain rules—refills are to be poured into a glass in use, not into a clean one taken from the cupboard; used dishes are to be brought to the kitchen rather than left in the yard or the bedroom. Many household possessions are communal property—a commons in the medieval sense.

Ostrom notes that state ownership and management is an alternative to privatization as a means of dealing with the dissipation of open access, but that there are many multiparty private arrangements as well. She observes that neither the state nor the market is uniformly successful in enabling individuals to sustain long-term, productive use of natural resource systems. Further, communities of individuals have relied on institutions resembling neither the state nor the market to govern some resource systems with reasonable degrees of success over long periods.⁵³

All communal properties have institutional arrangements to monitor and

⁵¹ Demsetz carefully avoided the static claim that resources would be private if and only if the benefits of privatization exceed the costs. “A proper interpretation of [Demsetz’s] assertion requires that account be taken of a community’s preferences for private ownership. Some communities will have less well-developed private ownership systems. . . . But, given a community’s tastes in this regard, the emergence of new . . . property rights will be in response to changes in technology and relative prices.” Demsetz, *supra* note 7, at 350. The Demsetz conjecture, then, can admit the existence of rent-seeking costs, although he implicitly holds them constant while varying the benefits and costs of privatization. While one society might chronically underdefine them, the likelihood that inadequate rights would be extended would increase as the benefits of privatization rose or the summed costs fell. Private rights could actually be overdefined, but the likelihood increases that existing (although excessive) rights would fall away if benefits decreased or the marginal cost of continuing claims rose.

⁵² Field, *Optimal Commons*, *supra* note 26; Ostrom, *supra* note 26. For a synthesis of Field and Ostrom as well as a great deal of related literature, see Thráinn Eggertsson, *Open Access versus Common Property*, in Anderson & McChesney eds., *supra* note 11, at 73.

⁵³ Ostrom, *supra* note 26, at 1. Also see Gary D. Libecap, *Contracting for Property Rights*, in Anderson & McChesney eds., *supra* note 11, at 142.

govern individual and group exploitation of the common-pool resource. Those arrangements are embodied in rules, more or less elaborate and more or less formal, perhaps enforced or even imposed by government, but often not. Instead of eradicating dissipation, the communal owners would be mindful of the cost of controlling it and search for a cost-benefit balance. Because of a positive and increasing marginal cost of reducing dissipation by increasing the strength of private rights, the optimal level of dissipation will be positive.

Ostrom notes that dissipation of communal rents is mitigated through familiarity among pool users.⁵⁴ Repeated interactions foster an opportunity to benefit from good reputation and to retaliate against inappropriate behavior. “In such situations, individuals repeatedly communicate and interact with one another in a localized physical setting. Thus, it is possible that they can learn whom to trust, what effects their actions will have on each other and on the [communal resource], and how to organize themselves to gain benefit and avoid harm. When individuals have lived in such situations for a substantial time and have developed shared norms and patterns of reciprocity, they possess social capital with which they can build institutional arrangements for resolving [communal property] dilemmas.”⁵⁵

Pointedly, many arrangements work best with no involvement of formal government because the users of communal resources often are better informed about inherent trade-offs among competing potential uses. In that event, external regulations may weaken or completely nullify superior communally organized rules and customs.

IV. AN INSTITUTIONAL MODEL OF PROPERTY RIGHTS EVOLUTION

The Demsetz-Field-Ostrom conjecture converts readily into a simple graphical model of institutional dynamics that incorporates communal property between the open-access and private endpoints as a continuous form lying where multiple people (perhaps a few, perhaps many) have an entitlement while everyone else is barred.⁵⁶

A. *The Discontinuous Strength of Property Rights*

Consider the total costs and total benefits of defining property rights where the objective is to mitigate rent dissipation efficiently. Suppose that the hor-

⁵⁴ Ostrom, *supra* note 26. Also see Robert C. Ellickson, *Order without Law: How Neighbors Settle Disputes* (1991); Ellickson, *supra* note 47.

⁵⁵ Ostrom, *supra* note 26, at 183–84.

⁵⁶ Alternative graphical models of the open access to private transition appear in Terry L. Anderson & Peter J. Hill, *The Evolution of Property Rights: A Study of the American West*, 18 *J. Law & Econ.* 163 (1975), and Terry L. Anderson & Peter J. Hill, *The Evolution of Property Rights*, in Anderson & McChesney eds., *supra* note 11, at 118, as well as the two interrelated articles by Field, *supra* note 26. Those models make no distinction between the capital and marginal costs of title.

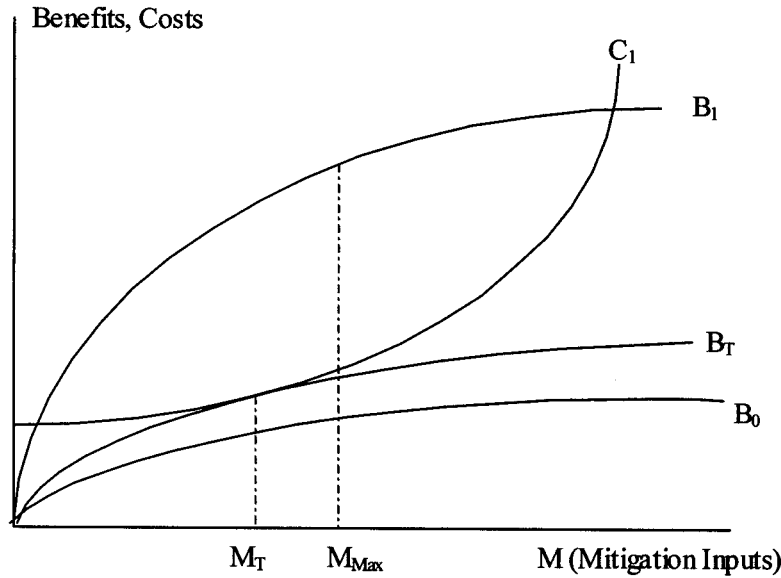


FIGURE 1.—Net benefit of property rights definition

horizontal axis of Figure 1 shows inputs devoted to exclusion of those who have no rights to use the property, while the vertical axis shows the total gross nominal benefit (pecuniary plus nonpecuniary) of that mitigation (shown by the curve labeled B_1). The vertical axis also shows the total nominal cost of efficiently achieving that level of mitigation (shown by curve C_1). It is the divergence between the private interest of individuals and the aggregate interest of groups that makes bearing such cost necessary.

For example, in an ant's society, where each individual acts to maximize the prospects of the nest as a whole, all effort would be devoted simply to squeezing grain out of the land in the most efficacious way. Then there would be no benefit to mitigating dissipation within the nest because incentives to seek private gain at a greater community expense seem absent among those insects. Consequently, it would be wasteful for ants to incur any cost in order to mitigate rent dissipation among the group. Let the ants become human, however, and the individuals are likely to try to maximize individual rather than (or at least in addition to) group prospects. Instead of using optimal effort for production, an incentive exists to divert some effort toward pure transfers of rent, and some of the rent will be dissipated in struggles over ownership. To control that shared tendency, the group as a whole could sensibly expend resources to curtail the dissipation, perhaps by monitoring exploitation and by penalizing misuse. Some of the group's effort would thus

shift from production to mitigating dissipation in order to control individual incentives to divert effort from production to redistribution.

Concretely, individuals have an incentive to divert some of their time from production if that diversion gains them more in the form of transfers from other individuals. But it is not a zero-sum game—we gain what you lose through our transfers (which thus cancel in aggregate), but in the process we lose what we could have produced had we applied the same time to production. Nobody reaps an offsetting gain from the latter loss.⁵⁷ Because the argument is symmetric, you similarly divert effort from production toward transfers from us, and in net we are all poorer. That is the dissipation. Of course, individually and communally we will divert other resources from production to protecting ourselves from your efforts to extract transfers, and you will do the same. That is the mitigation, and it too is costly.

But the productive efforts that are lost will not be random, nor will be the mitigating efforts that are undertaken. Wherever possible, the first moment withdrawn from production will be from the least important productive activities and will be devoted to the most effective mitigating activities. Of necessity, the next withdrawn moment must come from a somewhat more important productive activity (which is to say that the marginal opportunity cost of mitigation will be strictly increasing) but must be devoted to a somewhat less effective mitigating activity (which is to say that the marginal benefit of mitigation will be strictly decreasing). Those features account for the shapes of the curves labeled B and C on Figure 1.

Given the total benefit curve B_1 , M_{\max} is the input level devoted to mitigating dissipation (rather than to producing) that maximizes the value of the resource net of the cost of mitigating its dissipation. The level M_{\max} is reached where the two curves have equal slopes, in other words, where marginal benefit equals the marginal cost of mitigating dissipation.

Now examine alternative levels of benefits in Figure 1. Suppose that the curve labeled B_1 is not applicable after all but that instead the curve labeled B_0 is. The latter curve might be lower either because the price of the output being produced with the communal resource is lower or because the prices of inputs complementary to the resource are higher. Inspection of B_0 reveals that nowhere does the value of avoidable dissipation match the cost of mitigating it, so no effort will be devoted to controlling dissipation, and the resource will be in open access. Now let B gradually rise. Initially, that increase changes nothing; the resource remains in open access, although the dissipated rents are growing. Once B_T is reached, however, excluding some rights to the resource becomes worthwhile, and weak property rights form. But they do not form immediately to the right of the origin, but rather at

⁵⁷ See David D. Friedman, *Price Theory: An Intermediate Text* 565–69 (1990), for a graphical elaboration.

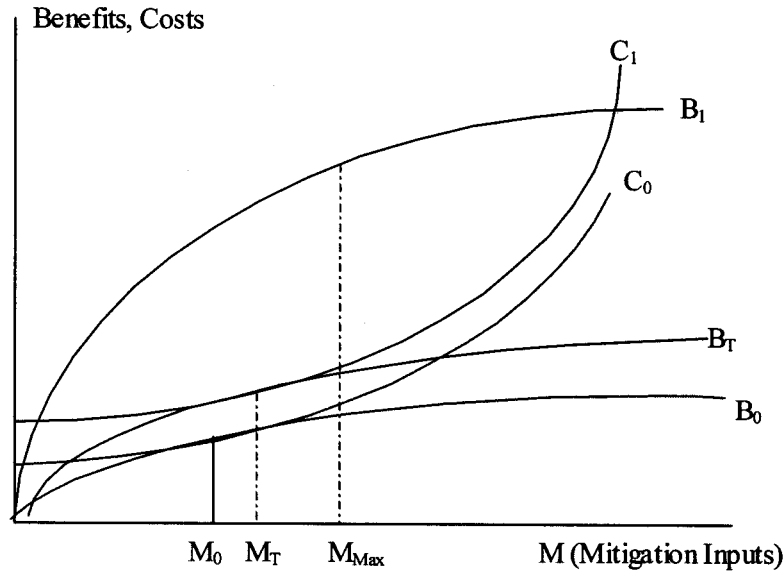


FIGURE 2.—Post-Black Death net benefits

M_T . In other words, there is a minimum strength of property rights that are worth forming.

But that is not all. Notice that the curve labeled C_1 intersects the vertical axis above the origin, implying some positive (fixed) cost required to accomplish the smallest possible level of mitigation or, put differently, to assert the weakest possible right. That includes the capital cost of forming property rights in the Demsetz model and thus encompasses the cost of defining the property to be claimed and of bearing the rent-seeking dissipation to settle on an owner. Being unsalvageable, however, once borne, those costs become irrelevant.

Now suppose that the resource shown here is some amount of a nonhuman factor of production during the era of the Black Death. Figure 2 shows the curve C and the alternative rent curves from Figure 1. But in addition, Figure 2 shows the curve C_1 lowered by the unsalvageable costs of property rights formation. Curve C_1 reflects the costs described above in the Demsetz model—marginal costs, any salvageable capital costs, and unsalvageable capital costs. Curve C_0 is the same except that the unsalvageable capital costs are to be excluded once they are sunk. Inspection reveals that the benefit level B_0 , which in Figure 1 was inadequate to motivate initial rights formation, is in Figure 2 just adequate to maintain those rights given that the unsalvageable capital costs could no longer be retrieved. In brief, B_0 was insufficient to warrant the formation of new rights, because that would have

required the full capital costs shown on C_1 , but was sufficient to warrant maintenance of established rights.

Thus, formation and abandonment of property rights are asymmetric. Substantial avoidable dissipation may be required to bring rights into being, but once the rights exist, the resource will be withheld from open access until opportunities to avoid dissipation have fallen some distance below that level. And if, after having subtracted the capital outlay, there is still a positive intercept of the cost curve with the vertical axis, or with S-shaped cost curves that near the origin are steeper than the rent curves, abandonment will occur abruptly as M_0 is passed. After M_0 has been passed, the ideal solution would move directly to the origin, which is to say, the resource would suddenly revert to open access. In other words, the property right would be abandoned although, since benefits are still positive, the property's use would continue. To coin an oxymoron, it would be wasteful not to waste some rents through open-access exploitation.

B. *The Approach to Private Property*

The preceding analysis of total costs and benefits captured the discontinuity and asymmetry of movements of open-access resources into and out of communal control. That analysis, however, does not demonstrate whether or when any entitlement would be private. In the real world, there are many dimensions over which the communal nature of property can vary—several people have individual entitlements to take game and timber from plot A, or person X has an exclusive entitlement to grow wheat on plot B between November and June (person Y having a similar entitlement over plot C), while X and Y share possibly nonidentical entitlements to graze animals over both B and C between July and October, and so on. As above, to examine the approach to purely private property, assume that the only way to mitigate rent dissipation is to exclude potential users of a resource. For simplicity, the only dimension modeled will be the number of people who share an entitlement, where all shares will be assumed identical.

Such a situation is shown in Figure 3, where MB illustrates the marginal benefit of excluding still another individual from communal property, and the various MC_{*i*} show the marginal costs of excluding them, given alternative exclusion technologies or input prices *i*. As discussed above,⁵⁸ MC would be monotonically increasing in the number excluded. Those most easily barred, being distant, disinterested, forthright, or lazy, require trivial cost. But a nearby, covetous, sneaky, and diligent target population is difficult to bar. Figure 3 shows the marginal benefits and marginal costs of changes in number of communal owners in various circumstances.

Next come the benefits: With some potential users excluded, each of the

⁵⁸ See text accompanying note 57 *supra*.

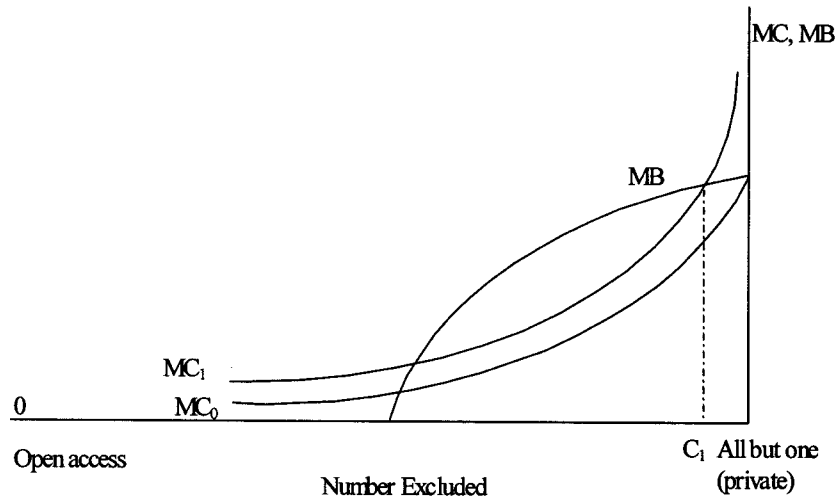


FIGURE 3.—Changes in marginal cost of property rights definition

others bears a larger share of any dissipation that his or her individual behavior produces. Marginal exclusion would eventually cause each remaining rights holder's incentives to converge on the exploitation rate that maximizes the resource rent, but for a large population the effect would be vanishingly small. Suppose a community of 2,000 decided to divide communal property into two equal parts, with 1,000 people permitted to use each. That would mitigate hardly any dissipation. A typical rights holder would now bear 1/10 of 1 percent of the cost of private overuse of the resource rather than 1/20 of 1 percent, but would still reap the entire gain. With positive information costs, people would be unlikely even to notice the difference. But even with a noticeable difference, only those few dissipations that yielded trivial private gains would be eliminated, and overly intensive exploitation would continue.

Subdividing a four-person communal property, in contrast, could easily have a measurable impact—either of the two people now exploiting a part would bear half the aggregate cost of private decisions rather than one-fourth, so the private gain necessary to motivate dissipation of the aggregate rent would increase by a noticeable absolute amount. Not only would the individual cost-benefit ratios eventually converge mechanically on the aggregate ratio as the number of rights holders decreased, those individuals would more likely have valued interpersonal relationships to jeopardize if one person's decision imposed a sizable cost on the other.⁵⁹ Thus, either of two rights

⁵⁹ Ellickson, *supra* note 54.

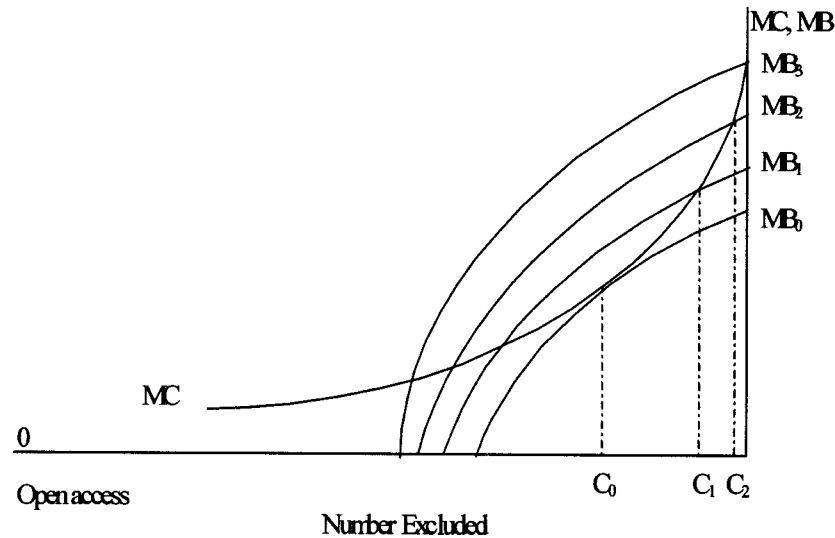


FIGURE 4.—Changes in marginal benefit of property rights definition

holders might undertake dissipating actions only if the private benefit were at least, say, 95 percent of the aggregate cost, quite a close approach to an outcome for completely private property. There would then be relatively little benefit from further severing the resource into completely private holdings.

If in Figure 3 the marginal cost of exclusion were at MC_0 or below, where MC_0 intersects MB at the vertical axis, the property would become private because the marginal benefit of excluding users exceeds the marginal cost for all levels of communal property. If the marginal cost of exclusion were MC_1 , however, the optimal number of participants in communal property would be C_1 , where the marginal benefit intersects the marginal cost from above, provided total benefit exceeds total cost.⁶⁰ If marginal exclusion cost were even greater, additional uses might be admitted for a time. But, as shown above, once total cost had risen so high that the total benefit failed to cover it, the resource would just be abandoned to open access, even though only a subset of all possible rights had previously been recognized. As before, the extent of communal property over a resource would be discontinuous, because there would be a tipping exclusion cost at which title to (but not use of) communal property would be abandoned rather than the number of rights holders being further expanded.

Similarly, as shown in Figure 4, marginal benefits could change as a result

⁶⁰ Total benefit would be the integral (area) under the marginal benefit curve from zero to the communal property size being considered, and total cost would be the integral (area) under the relevant marginal cost curve.

of new techniques or price changes for output or complementary inputs, while the marginal cost remained unchanged. The MB_i represent various marginal benefits of exclusion curves, while MC shows an unchanging marginal cost. Once a communal property had been established, the number of users would decrease as the value of mitigating dissipation increased, eventually reaching sole ownership at MB_3 . In contrast, again echoing Figures 1 and 2, the property would be abandoned at some point strictly before the marginal benefits fell to MB_0 because of the requirement that total benefits must exceed total costs.

As reformulated here, the Demsetz conjecture concerns movements of a resource through communal property of various strengths, not just the extremes of open access or purely private property, thus incorporating Ostrom's and Field's insights. The interplay of the marginal benefit and marginal cost of excluding an additional user would determine the efficient size of the communal property.

A similar analysis could be used to discuss governance. Or an isoquant-isocost analysis could be used to discuss exclusion and governance simultaneously. The implications that have been discussed would remain valid (although still others emerge), so we eschew those extensions in the interest of brevity.

V. EVIDENCE

The (nearly) fixed-proportions model would argue that other productive factors would have been abandoned after the Black Death in near proportion to loss of human life, while in stark contrast the standard variable-proportions model would imply that enforcement of nearly all factor titles would have continued. According to either model, title enforcement would lapse only if a resource no longer had an economically exploitable marginal product and thus had fallen into complete disuse. Both models are silent regarding any impact on serfdom.

In comparison, the property rights model implies that strength of rights would have changed following the Black Death in predictably divergent ways. Nonhuman resources would have been defended less vigorously. Occasionally they would have been abandoned outright, but more often they would merely have reverted to open-access exploitation. Open-access exploitation would have indicated only that the value of the dissipation that rights holders could prevent had fallen below the cost of enforcing the rights, not necessarily that the resource had no economically exploitable marginal product. In contrast to nonhuman resources, the property rights model predicts that rights to human resources would have consolidated. Since it is difficult to remove the laborer from decision making regarding the use of labor, much or all of the increased concentration would have come into the laborer's hands, with

a consequent erosion of feudal institutions. This section presents a nonsystematic sample of evidence from the secondary literature.⁶¹

A. *The Fixed-Proportions Model versus the Two Variable-Proportions Models*

According to the fixed-proportions model, if a lot of people died, then surely the various economic sectors would have contracted to fit. It will surprise few economists to learn that the model is easily rejected. There were indeed abandonments, but more frequently resources were converted to new uses appropriate to the altered environment. By 1270, well before the Black Death struck Europe, Kibworth Harcourt in Leicestershire had been endowed to Merton College, Oxford, and for centuries the college compiled and preserved detailed records. Completing a longitudinal study of those records, Cicely Howell determined that following the Black Death, “tenants took the more pragmatic approach of converting derelict houses into cattle sheds and barns [and] the villagers were active in tearing down derelict houses to improve others.”⁶²

No general shrinkage of resource use occurred. Some sectors demonstrably expanded, as the tables below will show. Such expansion occurred most often (as both the standard and property rights variants of the variable-proportions models predict) in sectors such as animal husbandry and exploitation of forests that were best able to take advantage of the cheapening land. In medieval Europe, those sectors also reflected more the attributes of communal than private property, which fits well with the property rights variant. Bruce Campbell found that because of early-fourteenth-century famines, arable acreage had been decreasing even before the Black Death, particularly in the midlands and southeast counties, but that “after 1350 . . . the withdrawal of land from cultivation coincide[d] with a rise in the average number of livestock per demesne.”⁶³ Thus, as predicted, land-intensive agrarian production began supplanting labor-intensive activities.

⁶¹ Where the secondary literature has focused on similar issues, the implicit operative hypothesis typically has been either the fixed-proportions or the variable-proportions model. To our knowledge, only North & Thomas, *supra* note 12, has applied a property rights model to the relevant epoch of European history, and its treatment of the Black Death per se was brief. Being unmindful of the property rights model and often focused on other issues, other secondary writers understandably report volumes of information unrelated to the critical tests relevant for distinguishing among the fixed-proportions, standard variable-proportions, and property rights models, and doubtless have discarded valuable evidence on point. The information reported here consequently manifests a high noise-to-signal ratio supporting rather tentative conclusions.

⁶² Cicely Howell, *Land, Family and Inheritance in Transition: Kibworth Harcourt 1280–1700*, at 55 (1983).

⁶³ Bruce M. S. Campbell, *Land, Labour, Livestock, and Productivity Trends in English Seignorial Agriculture, 1208–1450*, in *Land, Labour and Livestock: Historical Studies in European Agricultural Productivity* 144, 158 (Bruce M. S. Campbell & Mark Overton eds. 1991).

TABLE 1
LAND USE IN ESSEX, MEAN ACREAGE (Percent of Acreage)

Date	Arable	Meadow	Pasture	Wood	(M + P)/A
1272–1307	242.9 (90.2)	8.5 (3.2)	11.2 (4.2)	6.8 (2.5)	.08
1377–99	164.5 (76.1)	9.7 (4.5)	27.9 (12.9)	14.1 (6.5)	.23
1461–85	143.0 (68.4)	15.8 (7.6)	30.5 (14.6)	19.9 (9.5)	.32

SOURCE.—L. R. Poos, *A Rural Society after the Black Death: Essex 1350–1525*, table 2.2 (1991).

When the most fertile cropland fell idle because of tenant death, it would be added piecemeal to the obligations of surviving serfs. In the face of the traditional, sticky medieval factor shares that retarded adoption of labor-saving techniques, tenant-bereft lords often tried to impose the transfers on unwilling serfs. “William Bacon, the lord’s serf, is living in Winlaton, and the jurors say that he is able to hold a bondage tenement in Ryton. Therefore it is ordered that he be fetched back. . . . All the neighbours of Easington are ordered to put waste cottages upon employees or others who can be charged with the farm before the next hallmoot, or otherwise the said cottages [which at that time implied farmland as well as an accompanying dwelling] will lie upon the said village. . . . William Meggison and Thomas Saynyng are capable of holding a waste land called the land of John Batell. And it has been committed to them. And they are to begin to pay at the feast of St Cuthbert. . . . One land out of three in the lord’s hand is committed to William Woderof in his absence because it is presented by Roger de Tykhill that he is capable of holding the said land. And he is to begin to pay at the feast of St John next.”⁶⁴

The lords’ efforts to retain the high per-acre outputs associated with the prior labor-land ratios were unavailing. The drastic population decline meant that cultivation on marginal lands soon had to be abandoned, and those acres were often consolidated into pasture. L. R. Poos notes that “the post-Black Death period witnessed shifts in local agriculture and land use as animals gained in relative importance to grain.”⁶⁵ Poos’s Essex data, summarized in Table 1, corroborate Campbell’s findings from the Midlands and Norfolk.⁶⁶ Using postmortem records from well before until well after the initial epidemic, Poos documented that across the entire fourteenth century arable acreage declined by 32.3 percent, with a continuing but smaller decline through the subsequent century. In contrast, pasture acreage increased by 149 percent and woodland more than doubled. Those results are radically inconsistent with the fixed-proportions model.

⁶⁴ From the Durham hallmoot book as reported by Rosemary Horrox, *The Black Death 329–30* (1994).

⁶⁵ L. R. Poos, *A Rural Society after the Black Death: Essex 1350–1525*, at 9 (1991).

⁶⁶ Campbell, *supra* note 63.

TABLE 2
LAND USE IN ARDEN, WARWICKSHIRE, MEAN ACREAGE (Percent of Acreage)

Date	Arable	Meadow	Pasture	Wood	$(M + P)/A$
1345–55	1,790 (70.4)	209 (8.2)	182 (7.2)	328 (12.9)	.22
1496–1500	1,193 (34.5)	299 (8.6)	1,319 (38.1)	646 (18.7)	1.36

SOURCE.—Christopher Dyer, *Occupation of the Land: The West Midlands*, in 3 *The Agrarian History of England and Wales*, table 2.9 (Joan Thirsk ed. 1991).

TABLE 3
LAND USE IN THE AVON VALLEY AND FELDON, WARWICKSHIRE,
MEAN ACREAGE (Percent of Acreage)

Date	Arable	Meadow	Pasture	Wood	$(M + P)/A$
1345–55	2,533 (95.1)	118 (4.4)	12 (.5)	0 (0)	.05
1496–1500	2,850 (56.7)	475 (9.4)	1,654 (32.9)	48 (1.0)	.75

SOURCE.—Christopher Dyer, *Occupation of the Land: The West Midlands*, in 3 *The Agrarian History of England and Wales*, table 2.8 (Joan Thirsk ed. 1991).

Christopher Dyer⁶⁷ found similar postepidemic shifts in land use in the West Midlands in surviving land conveyance and transfer documents. In two parts of Warwickshire, the percentage of acreage in arable fell by nearly half, while pastures increased almost by a factor of 10, as shown in Table 2. The percentage of exploited land in meadow and woodland also increased, although not nearly as dramatically as pasture. Perhaps as a result of inter-regional migration, absolute acreage in use increased even for arable in a few locations, as seen in Table 3. Even in those instances, land-intensive sectors grew more strongly. In Warwickshire at least, use of nonhuman factors had not fallen along with the human factors. Dyer also reports land use changes from Gloucestershire postmortem inquisitions and Worcestershire court rolls that corroborate the Warwickshire results, as seen in Tables 4 and 5.

Although the dates of the first observations are more than 3 decades after the Black Death, the Worcestershire data nonetheless show a continuing relative shift away from arable, which suggests the impact of episodically recurring epidemics. Dyer's findings for Staffordshire (which we do not recapitulate) were consistent.

We take it that the fixed-proportions model can safely be put aside. There are puzzles in the data, but the fixed-proportions model offers no insight. Not only did human and nonhuman factor use fail to decrease in coordination, the use of some nonhuman factors increased following the Black Death. How do the other models account for that?

⁶⁷ Christopher Dyer, *Occupation of the Land: The West Midlands*, in Thirsk ed., *supra* note 5, at 3:77.

TABLE 4
LAND USE IN GLOUCESTERSHIRE, MEAN ACREAGE (Percent of Acreage)

Date	Arable	Meadow	Pasture	Wood	$(M + P)/A$
1349–54	2,122 (83.1)	214 (8.4)	55 (2.2)	81 (3.2)	.13
1485–1500	1,390 (46.0)	410 (13.6)	1,042 (34.5)	181 (6.0)	1.04

SOURCE.—Christopher Dyer, *Occupation of the Land: The West Midlands*, in 3 *The Agrarian History of England and Wales*, table 2.10 (Joan Thirsk ed. 1991).

TABLE 5
LAND USE IN BROMSGROVE AND KING'S NORTON, WORCESTERSHIRE,
MEAN ACREAGE (Percent of Acreage)

Date	Arable	Meadow	Pasture	Wood	$(M + P)/A$
1386–96	409 (81.3)	76 (15.1)	12 (2.4)	6 (1.2)	.22
1494–1504	848 (53.3)	278 (17.5)	352 (22.1)	114 (7.2)	.74

SOURCE.—Christopher Dyer, *Occupation of the Land: The West Midlands*, in 3 *The Agrarian History of England and Wales*, table 2.11 (Joan Thirsk ed. 1991).

Since the property rights model is an extension of the variable-proportions model, many predictions are similar. For instance, each would view characteristic land use changes the same way—nonhuman factors became cheap following the Black Death but human factors became expensive. In a frictionless society, there would have been a prompt substitution of the one for the other.⁶⁸ The marginal product of human factors would have increased, while the marginal product of nonhuman factors would have decreased. The lord of the manor in that frictionless society would of necessity have acquiesced to inevitable changes in farming techniques by reducing his share, thus persuading each peasant voluntarily to cultivate more arable land in a less labor-intensive fashion and to use more pasture.

Even so, farming would have consumed more labor than did herding. Since it was relatively land intensive, animal husbandry would have expanded more as a result of the fall in land rents. The price of meat and cheese would have fallen relative to the price of farmed products. Consumers would in consequence have shifted consumption toward meat and cheese and, therefore, in a relative if not necessarily absolute sense, away from arable products. So even though land would have been substituted for labor in all sectors of agriculture, the substitution would have proven relatively weaker in arable.

⁶⁸ There were strong frictions—many feudal institutions had for centuries been traditional, and consequently markets were attenuated. As among the East Germans following the fall of the Berlin Wall, there was relatively little human capital specialized to coping with markets. There was a strong interest group—manor lords and their overlords—that would be severely injured by a shift from a feudal to a market economy. It will be seen that eventually those frictions were overwhelmed, but we put that aside pending our discussion of serfdom *infra*.

TABLE 6
CHANGES IN NET YIELD PER ACRE IN NORFOLK

Demesne	Percent Change, 1300–1324 to 1400–1424
Hindolveston	–48.1
Martham	–41.2
Plumstead	–31.0
Sedgeford	–25.4
Taverham	15.6
Mean (average)	–31.3

SOURCE.—Bruce M. S. Campbell, *Land, Labour, Livestock, and Productivity Trends in English Seigneurial Agriculture, 1208–1450*, in *Land, Labour and Livestock: Historical Studies in European Agricultural Productivity*, table 6.7 (Bruce M. S. Campbell & Mark Overton eds. 1991).

That result shows clearly in each of the above tables. Even in regions where arable acreage increased, as shown in Tables 3 and 5, the share of total acreage in use fell.

The increased marginal product of labor is confirmed by a sharp wage increase that has been documented by numerous historians and will enter the discussion below when changes in serfdom are discussed. The decreased marginal product of arable land can be confirmed from net yields per acre. As shown in Table 6, Campbell's Norfolk data⁶⁹ indicate a 31 percent decline in that yield across five different locales and five separate crops—wheat, rye, barley, oats, and legumes. Only Taverham appears as an outlier.

If the fixed-proportions model was accurate, one would expect no such per-acre yield decreases since the application of other productive factors to each acre of land in use would be similar both before and after the Black Death. The other models, in contrast, would predict a decreased application of complementary human factors to each acre after the epidemic and thus precisely the falling per acre yields seen here. The predictions of the fixed-proportions model fail once again. Discard it.

B. *The Standard Variable-Proportions Model versus the Property Rights Variant*

All three models can encompass positive levels of resource abandonment: “Some abandonment of arable resources was well-nigh universal, and even on manors which survived as grain producers land was taken out of cultivation.”⁷⁰ But the evidence of the previous section is inconsistent with the

⁶⁹ Campbell, *supra* note 63.

⁷⁰ R. H. Britnell, *Occupation of the Land: Eastern England*, in Thirsk ed., *supra* note 5, at 53, 56.

fixed-proportions model, although consistent with the implications of either of the others. The two survivors part company regarding other implications.

By recognizing that effective maintenance of title is costly, the property rights model would predict more failure to enforce title following the Black Death than would the standard variable-proportions model—the potential for a positive marginal product would have to utterly disappear before resources were abandoned under the standard model, but title to still other resources whose marginal products fell to modest positive levels would be abandoned under the property rights model. Without being able to measure marginal products directly, however, it is difficult to quantify exactly what would prove convincing as more abandonment of title.

An informed intuition helps. There is extensive evidence of the abandonment of marginal lands in the wake of the Black Death. The population increase of the thirteenth century atop a tradition of primogeniture had induced the junior sons of the manorial lords, accompanied by some offspring of their father's serfs, to form new manors on previously unclaimed lands. Each of the models can survive discovery that some of those more recent manors were abandoned after the Black Death, with the land reverting to open access. When does "some" become "an awful lot"? There was extensive abandonment in the West Midlands in the late fourteenth century, part of an extended process that continued through the end of the fifteenth century: "[A] unique source for Warwickshire, the list of desertions compiled by John Rous, a local chantry priest and chronicler, shows that sixty villages, or about half of the county's total, had been deserted by about 1486. . . . The first important phase of total desertion of villages came in the late fourteenth century. . . . Eleven of the twenty-six holdings in Weston-juxta-Cherington (War.) were vacant in 1355."⁷¹

Similar evidence of intensive and extensive abandonment comes from Yorkshire, East Anglia, Norfolk, and Suffolk.⁷² Although certainly not conclusive, abandonment of 42 percent of one Warwickshire village's holdings in well under a decade and the complete desertion of half the county's villages after a century and a quarter of recurring epidemics is impressive. We conjecture that few disciples of the standard variable-proportions model would have offered predictions of such magnitudes of abandonment before seeing that data. Nor would one predict that all of that land became literally deserted as opposed to being exploited by a number of people under a nonexclusionary informality. Such Bayesian predictions might, of course, be wrong, but they are consistent only with the property rights model.

In the West Midlands, "from 1349 to the end of the fifteenth century shrinkage of rural settlement is found in all parts of the region, a shrinkage

⁷¹ Dyer, *supra* note 67, at 85–86.

⁷² Colin Platt, *King Death: The Black Death and Its Aftermath in Late-Medieval England* 15–16 (1996); Campbell, *supra* note 63.

that appears in decreasing numbers of manorial tenants and in the abandonment and decay of dwellings. . . . [S]hrinkage of settlement seems to have been initiated by the Black Death of 1349.”⁷³

P. D. A. Harvey found that near London the pattern of abandonment varied greatly but that the greatest depopulation occurred where intensive cultivation had once been common: “[I]t seems likely that decrease in the demand for land following the Black Death and the general shrinkage of settlements reduced some of these places to a size that made them no longer viable communities.”⁷⁴ Those home county abandonments often accompanied reversion of the land to waste, particularly when manors contracted or disappeared because the landlord could attract no new tenants.⁷⁵

Both the variable-proportions and the property rights models would predict abandonment whenever positive marginal products dissolved, so the more crucial prediction concerns resources with positive marginal products that were insufficient to merit the cost of enforcing a claim. But if claims were unenforced while marginal products were positive, one would expect informal exploitation of the resource. Although for a time prior owners may have maintained a pretense of ownership, for all practical purposes the resource would have fallen into open access.

Although the evidence treated the fixed-proportions model harshly, it does not distinguish as compellingly between the variable-proportions and property rights alternatives, but it is surely suggestive. By the 1420s, for instance, one-third of Kibworth Harcourt was without tenants.⁷⁶ “It would seem that the land was simply allowed to lie fallow, grazed by the village flocks. But if this was the case, it is difficult to understand why some tenants were prepared to lease the grazing from some of these virgates [although] for one-third of the [customary] rent.”⁷⁷ Perhaps understanding that is not as difficult as Howell believes. It is inescapable that untenanted land that was being used by unspecified members of the village for uncompensated (and probably unimproved) grazing had a positive marginal product, but one so meager that the legal owner, Merton College, was unwilling to bear the cost to exclude those unauthorized users. The property rights model would interpret parallel rents being paid for other grazing as evidence that avoiding open-access dissipation on superior land, even when used only for grazing, continued to afford sufficient benefit to justify Merton’s bearing the burden of enforcing its claims. Because the latter holdings were superior, individuals would have been willing to pay rent for the privilege of excluding other potential users.

⁷³ P. D. A. Harvey, *Occupation of the Land: The Home Counties*, in *The Agrarian History of England and Wales*, Vol. 3, 106, 108–9 (Joan Thirsk ed. 1991).

⁷⁴ *Id.* at 111.

⁷⁵ *Id.* at 116.

⁷⁶ Howell, *supra* note 62, at 50.

⁷⁷ *Id.* at 53.

That ability to exclude, in turn, would have given a renter an incentive to optimize the plot's exploitation and to improve it to enhance the renter's return.

Although the prior quotation indicates that people used land over which they had no legal right, presumably too intensively to maximize its output, understandably they hesitated to make site-specific investments because open-access dissipation was less than the cost of asserting title in order to capitalize on the investment. "It is interesting that in spite of the acute shortage of wood . . . none of this surplus land was planted as woodland. Between 1422–32, no less than seven persons were prosecuted for felling ash, two for felling elms and fines were taken for felling apple trees and willows, but there is no record of systematic tree planting until the seventeenth century."⁷⁸

Harold Fox notes that at least one court issued a general order to peasants to make good their boundary marks, although he does not indicate how effective the order was.⁷⁹ Why would a court care if cultivators kept track of their boundaries? If they were not worried about encroachment, why should the court? The answer is that the peasants were not the recognized owners of the land, which would have been the lord of the manor. Before the Black Death, the land market had cleared (or, conceivably, it had been in shortage because of the traditional and sticky customary sums and services due the lord), so peasant self-interest had incidentally assured that nobody could use land without recompensing the lord.⁸⁰ A cleared market implied a willing and rent-paying tenant who would report encroachments. Rents did not fall to market-clearing levels for decades after the Black Death, however, so land went into surplus. That would have enabled surviving peasants to expand their cultivated acreage without encroaching on neighboring holdings and therefore without being forced by their fellows to acknowledge the expansion to the lord. In such instances, they were enabled to evade the lord's customary share.

As long as there remained open patches to be taken up by every ambitious farmer, there was no competition among them and thus little incentive to complain about illicit use. In 1407, at Kibworth Harcourt, tenants began defiantly to withhold information concerning abandonments.⁸¹ Apparently, it had become too costly for the lord to control the property closely given the necessity for increased direct monitoring coupled with gradually falling rents. Despite the lords' occasional unwillingness to enforce title, it is clear that most properties remained in use. In Compton Verney, "there were many problems of trespass, both within the village and from nearby. . . . The lord scarcely knew what was happening to his once orderly manor, and, more

⁷⁸ *Id.* at 55.

⁷⁹ Fox, *supra* note 10, at 61.

⁸⁰ Fryde, *supra* note 5, at 754.

⁸¹ Howell, *supra* note 62, at 50.

important, the leading villagers seem to have taken no action to remedy this lack of control.”⁸² What had been the lord’s property rights had sometimes become peasants’ usufruct rights.

“The woodlands saw a shift from arable to pasture, reversing the trends before 1300. . . . The increase in livestock led to stresses among the neighbors, with complaints that selfish individuals were keeping excessive numbers of animals on the common pastures.”⁸³ The passage indicates that many pastures continued to be communal property rather than private holdings but that communal rules were simultaneously eroding. Some resources that had been held as communal property before the Black Death continued in that status but had moved toward (although not to) open access.

C. *The Decline of Serfdom*

Once it becomes unattractive for an owner to continue bearing the cost to enforce title, who will object if the entitlement is abandoned? Nor will strife result when the benefits of claiming a resource are too low to motivate undertaking the investment. In distinction, there will frequently be contention among mutually exclusive alternative owners when it becomes attractive to claim or consolidate title to a resource of growing value. The erosion of serfdom was such an instance. This section examines the process through which stronger property rights in human labor emerged during that episode.

Of the three models, only the property rights version yields obvious predictions regarding the impact of the plague on serfdom. Serf labor was a form of communal property.⁸⁴ As with other forms of communal property, joint ownership rights generated some dissipation, but as long as the marginal product of labor was low, the value dissipated was relatively unimportant and would not support a substantial control cost. As labor grew dramatically scarcer across the many plague decades, the marginal value of the dissipation grew. The property rights model predicts that to mitigate that dissipation some individuals would devote resources to strengthening claims over that resource of increasing per-unit value. The conjecture is that traditional bonds on feudal labor would weaken and workers would gain increased ability to negotiate over wage levels and to change the nonpecuniary terms of work relationships.⁸⁵

⁸² Christopher Dyer, David Hey, & Joan Thirsk, *Lowland Vales*, in *The English Rural Landscape* 78, 86 (Joan Thirsk ed. 2000).

⁸³ Christopher Dyer, *Woodlands and Wood-Pasture in Western England*, in Thirsk ed., *supra* note 82, at 97, 113–14.

⁸⁴ See text accompanying notes 17–22 *supra*.

⁸⁵ Barzel, *supra* notes 20 and 21, argues that, because of a worker’s own ability to adjust labor effort coupled with the cost to anyone else of monitoring that adjustment, workers are likely to acquire increased rights in their own labor as the value of labor rent dissipation grows. Hirshleifer, *supra* note 4, at 109–10, offers a brief, generally parallel account of the decline of serfdom, albeit without arguing that the communal property nature of serf labor was a causal factor.

The other stakeholders did not willingly relinquish their claims, and history provides insight into the process by which stronger property rights are claimed from a weaker status. Almost immediately, workers began to refuse to perform customary tasks unless more compensation and fewer servile obligations were forthcoming. On account of regional variability, some lords saw many of their serfs succumb to the plague, while other lords lost few. Facing an alternative of hardly any labor at all, the bereft lords agreed to the serf's demands and then refused to return runaways to their home manors. The lords' age-old tradition of labor market noncompetition had begun to crack.

In response, in 1349, as the Black Death still raged, Edward III forbade the payment of wages to workers higher than those paid in 1346, as well as movement of workers from their existing jobs. Initially urban areas cooperated in enforcing the statute: "Several bakers' servants were indicted in July 1349 for forming a conspiracy not to work for their masters except at double or treble the wages formerly given, and one William Amery was sent to prison for having demanded 5s. for some work which another mason then did for 12d."⁸⁶

Enforcement of the decree proved difficult and sporadic, and complaints from employers led Parliament to codify similar provisions as the Statute of Labourers of 1351. The statute explicitly laid out maximum wages that could be paid for various types of workers, and workers who did not swear obedience to the statute could be sent to jail.

In some places, authorities tried to enforce the statute strictly, and when the economy began to stabilize by 1354, wages were lower than they had been earlier in the decade, although even then they appeared to remain near the statutory wage caps.⁸⁷ Consider, however, that modern price and wage controls are often evaded by employing fallacious categories regarding the transacted items. Although we have yet to find evidence bearing on the possibility, unsuspecting officials might, for instance, have taken a shepherd who was claimed by a desperate lord to be a carpenter to be statutorily entitled to a wage that was in truth a violation.

Other authorities began treating the "fines" for violations as though they were merely a tax for financing the Hundred Years War rather than an effort to cap wage rates.⁸⁸ Maintaining marginal wage rates at pre-Black Death levels would have required imposing prohibitory fines on violators, a set that shortly would have consisted only of the unsuspecting. Prohibitive fines would generate no war revenue, however, and a monopolist does not want to quote a price so high that no customer will buy. Maximizing revenue, in other words, would have necessitated a substantially more moderate fine/tax, one that would induce violations of the statute.

⁸⁶ Farmer, *supra* note 6, at 483.

⁸⁷ *Id.* at 484.

⁸⁸ Fryde, *supra* note 5, at 755–59.

That the fines were not prohibitory is evidenced by the appearance of a new profession—agents began to appear who would match labor-short lords with serfs willing to risk the fine that came with the new employment.

At the Suffolk sessions of June 1361, a man described as a weaver was accused of being a “common procurator of agricultural *famuli* for taking them outside their vill in the autumn.” At the Norfolk manor of Forncett, belonging to the countess of Norfolk, a man was indicted for leading each autumn six or eight others outside the manor to work at higher wages. [T]he countess . . . had largely lost control over her servile tenantry of disgruntled smallholders. . . . At the bishop of Worcester’s manor of Bibury, in south-eastern Gloucestershire, on a single day . . . the reeve brought from outside as many as 127 men, hired at the illegal wage of 5d. a day, to gather and bind the lord’s [grain], in addition to employing all the bishop’s tenants from Bibury.⁸⁹

By 1361 the plague had reemerged in rural England. “Again manors had to bid against each other to attract workers. . . . Parliament now compelled the justices to hold their sessions more frequently, and the crown authorized them to enforce the old labour laws. . . . In general the justices’ efforts to control wages in the 1360s and later seem to have been less successful than in the 1350s. . . . By the early fifteenth century . . . most workers were getting at least 50 percent more than the payments stipulated in 1351, and in most cases their wages continued to rise thereafter.”⁹⁰

Manorial lords tried to retain control over workers by using their own auditing systems and courts, but “neither statutes nor auditors could isolate manorial wage bills from the general economic pressures of the time.”⁹¹

Eventually the lords’ attempts to use the legal system to cartelize conditions of servitude generated revolt among the peasants, most famously Wat Tyler’s Rebellion. In 1381, a third of a century after the initial onslaught of the Black Death and on the heels of the third major plague epidemic, mobs began destroying the property and even the lives of their overlords, government officials, and lawyers. By mid-June, Wat Tyler, a charismatic blacksmith, and Jack Straw, a peasant who had risen to leadership of a similar revolt on the opposite bank of the Thames, assembled an estimated 100,000 peasants and led them in a march on London. Although a new tax seems to have provided the immediate focal point around which disgruntled peasants rallied, the anonymous author of the contemporaneous *Anonimalle Chronicle* asserted that “the supreme and overriding purpose of the revolt was the abolition of villeinage and all that went with it.”⁹² The 14-year-old King Richard II, deserted by frightened advisors and troops, agreed to their demands for an end to serfdom and a reduction in customary land rent. The rebels’ success

⁸⁹ *Id.* at 758–59.

⁹⁰ Farmer, *supra* note 6, at 485–86.

⁹¹ *Id.* at 489.

⁹² Quoted in Fryde, *supra* note 5, at 760.

was ephemeral. They were repelled as troops finally rallied to Richard. Tyler was killed, and the king's promises were put aside.

Perhaps one would doubt that poorly organized peasants, mainly on foot and armed with farm implements, could have fared even that well against an organized, mounted, and well-armed opponent. But they had, and the serfs' close approach to freedom in 1381 inspired five more revolts before 1405,⁹³ which reflected the growing stress within the feudalism system. On Merton College's Kibworth Harcourt manor, "the full effect of the late fourteenth-century plagues were . . . felt [by] the 1420s. [S]uccessive high mortalities so eroded the traditional stability of the population that [the manor] was reluctantly compelled to concede not only a drop in rents but also the abandonment of labour services and bond tenure."⁹⁴

In other English locales, serfdom disintegrated more gradually.⁹⁵ "In the course of roughly a century after 1381 the servile peasantry, by persistent nibbling at the whole structure of servile exactions, greatly reduced its profitability to the lords until the point was reached when it became wiser not to mention serfdom at all."⁹⁶ By the time Columbus crossed the Atlantic, English serfdom had for all practical purposes been consigned to history. But the process of reconfiguring property rights to labor in response to strongly altered factor price ratios had been long and bloody.

VI. CONCLUSION

Fascination with such ancient and horrific epidemics may seem morbid to those of limited historical literacy, but the Black Death truly was one of the momentous episodes not only of European but of world history. The pestilence initiated a sea change in factor proportions. Although there was substantial geographical variability, the ratio of land to human factors, both labor and human capital, increased quickly and dramatically and then remained at elevated levels for centuries as a result of recurring epidemics. Over an extended period, per capita income remained at unprecedented levels, inducing an increased rate of capital accumulation as evidenced by a long-term slide in real interest rates.⁹⁷ Thus, by the time initial land-labor

⁹³ *Id.* at 797.

⁹⁴ Howell, *supra* note 62, at 57.

⁹⁵ Serfdom eroded even more gradually in some other parts of Europe, with Russia, the last holdout, abolishing the institution only in 1863.

⁹⁶ Fryde, *supra* note 5, at 768.

⁹⁷ It is difficult to determine interest rates directly from the time of the Black Death, but in *Corn at Interest: The Extent and Cost of Grain Storage in Medieval England*, 74 *Am. Econ. Rev.* 174 (1984), D. N. McCloskey and John Nash compiled a range of estimates by (for example) observing commodity price increases from the end of one year's harvest to the beginning of the next. Their estimate bounds on real interest rates from the 1300s range from above 20 to more than 50 percent, with something over 30 percent seeming most likely. By the 1700s, real interest rates had fallen dramatically to near modern levels.

ratios had been restored after the Black Death, the capital-labor and human capital–labor ratios had drifted even further from their original levels, with the compounded investment in new techniques being an important component.⁹⁸ In brief, factors have never regained pre–Black Death proportions. If we are lucky they never will.

Relying on the theoretical foundation of property rights economics, this article deduced a number of theoretical implications concerning the evolution of medieval property rights following the Black Death and reported some tentative findings drawn from the secondary literature. Property rights economics purports that forming and holding economic rights is costly and thus will become more prevalent as the benefits of holding rights grow relative to those costs and vice versa. Changes in the benefits and the costs usually come slowly, however, and are thus frequently dominated by an aggregation of changes in a multitude of other economic features great and small and in that way become difficult to separate from statistical noise.

But in the middle of the fourteenth century, the abruptly changed benefits and costs became by far the paramount statistical event of the age. The benefits and costs of property rights changed so rapidly, in fact, that contemporaries were initially at a loss to discern a proper reaction. Human resources had increased greatly in value relative to other factors of production and eventually came to be protected much more assiduously against dissipation of their rent. That resulted in a severe weakening of serfdom and related feudal institutions, institutions that in effect treated human factors more as communal property than as private property.

In stark contrast, nonhuman resources, especially land and structures, became less valuable and were tended less assiduously, and in a great many instances enforcement of title was abandoned altogether. The lord of the manor might continue to claim (although not always to enforce) title, but many peasants who had been the proximate users of the resources abandoned their subordinate claims utterly, even when that required leaving their home villages altogether in order to escape the beleaguered lord's wrath. That is to say, many nonhuman entitlements were returned to open access. In some instances, however, those newly open-access resources must have had positive marginal products because they remained in use, an observation that was predicted by the property rights models but not by either of its competitors.

The empirical story here, relying as it does on unsystematic perusal of the secondary literature, is merely a suggestive challenge and can by no means

⁹⁸ Because of its chronic nature, the Black Death thus differed markedly from, for instance, the 1918–19 influenza epidemic. Although the flu epidemic was a massive killer of people worldwide, thus markedly altering factor ratios and per capita income, the disease has not recurred subsequently on a similar scale. After a time, the growth path of the U.S. economy seems to have returned to its pre-flu time path. See Elizabeth Brainerd & Mark V. Siegler, *The Economic Effects of the 1918 Influenza Epidemic* (paper presented at the Northwestern University Economic History Seminar, September 2002).

be taken as conclusive. Researchers who were not in command of the property rights model collected empirics relevant to that model only by happenstance, which in this instance was rare. To investigate primary sources will take time insofar as fourteenth-century data are catalogued haphazardly, often have been permitted to deteriorate, and in many instances are inventoried in inconvenient locations. The entries are sometimes in difficult language for a modern researcher. At best, one hopes for a literate Latin or the Middle English of Chaucer's day. When forming a baseline from earlier English records, regional Anglo-Saxon dialects and bastardized Saxon-Norman French may have to be mastered. In many parts of today's France, now-extinct provincial tongues would have been in use. The advantages of a well-focused investigation of primary sources are manifest, however. Among other things, such data might permit a test of implications (unreported here) that derive from a model that simultaneously treats governance and exclusion as complementary ways of controlling dissipation within communal property.

While awaiting more compelling tests of the hypothesis, a property rights perspective on the Black Death serves as a convenient focusing mechanism by which various historical occurrences can be more easily examined and remembered. The authors have found that focus to be a useful one.