Property Rights and Contract Form in Medieval Europe*

Alexander Volokh†
Georgetown Law and Economics Research Paper No. 969797

March 22, 2007

Abstract

Throughout western Europe, beginning about 1200, leasing of feudal lords' estates became more common relative to direct management. In England, however, direct management increased beginning around the same time and until the fourteenth century, and leasing increased thereafter.

This article models the lord-peasant relationship as a game where contract form is chosen as the result of a tradeoff between incentives for high effort and excessive risk-bearing. Leasing increases as peasants' living standards improve. As for England, the increase in direct management can be explained by property law innovations that increased the security of freehold tenure, and the increase in leasing can be explained not only by improving living standards but also by increasing security of leasehold tenure. This model also explains why small landowners are more likely to manage their land directly, and why large landowners are more likely to lease their small estates than their large ones.

*I am grateful to Nigel Ashford, John S. Beckerman, Bruce M.S. Campbell, Gregory Clark, Charles Donahue, Louis Kaplow, Daniel M. Klerman, Michael McCormick, Edward R. Morrison, Nicholas Poynder, Jesse M. Shapiro, Vladimir Volokh, and Mungo Wilson for comments and guidance. I have also benefited from the reactions of seminar audiences at the Harvard Economics Department's Economic History Tea and the Institute for Humane Studies' Summer Graduate Research Fellowship meetings.

†Visiting Associate Professor, Georgetown University Law Center, *av266@law.georgetown.edu.*

Contents

I Introduction

In this paper, I propose a solution to a longstanding puzzle of medieval economic history. Throughout western Europe, from about 1100 to about 1500, on feudal lords' estates, leasing became more common relative to direct management — except in England. England experienced an "era of high farming," starting sometime around 1200 and continuing for over a century, when lords moved toward greater direct management of their estates.

Economic and legal historians have being trying to explain this English anomaly for as long as they have been aware of the broad outlines of the chronology — perhaps since Postan's (1937) seminal article on "The Chronology of Labour Services." Unfortunately, many of their explanations either do not hold up well in light of the data or seem inconsistent with modern contract theory.

I propose that the most natural explanation of an England-specific phenomenon rests on the evolution of English law, which was obviously not present on the Continent. First, I explain why rising peasant living standards can explain increased leasing: As peasants become better off and therefore less risk averse, they become more willing to lease — a contractual arrangement that carries greater risk but also provides greater incentives for productive effort. Second, I explain that the English movement toward greater direct management, which started in some areas in the late twelfth century, roughly coincided with important developments in property law that made freehold tenure more secure, and I model how such developments can be expected to lead to more direct management. Third, there remains the English movement back toward greater leasing. This requires no further explanation, since peasant living standards were increasing at that time, which can already be expected to lead to increased leasing once the developments in freehold tenure had stabilized. However, in-

creased leasing in England starting in the fourteenth century can additionally be explained by roughly contemporaneous improvements in the security of *leasehold* tenure.

This explanation is more plausible than most existing theories of contract choice in medieval agriculture, and matches the English trends with English legal history.

Section II gives a rough chronology of the trends in agricultural contract choice in England and on the Continent, and surveys and critiques some of the existing explanations. Section III models contract choice as a one-period game between a lord and peasant, where the choice between direct management and leasing trades off risk sharing and incentives for high effort. This section shows (1) why leasing increases as peasants' living standards increase, (2) why small landowners do more direct management than larger landlords, and (3) why large landowners with various estates of differing sizes are more likely to lease their small estates than their large ones. Section IV shows that direct management increases as the security of freehold property rights increases. Section V shows that leasing increases as the security of leasehold property rights increases. Section VI contrasts the English evolution with the development of law on the Continent. Section VII discusses, but does not resolve, why there was so little sharecropping in England. Section VIII concludes.

II Direct management vs. leasing

A Chronology

The basic unit of agricultural organization in the Middle Ages was the manor — "an agricultural estate, great or small, over which lordship was exercised" (Bolton 1980, p. 17). The lord of the manor — who could be either a layman

or an ecclesiastical institution (for instance, a bishopric or a monastic house (see Harvey 1988, pp. 78–85, 97–121; Campbell 2000, p. 1)) — could grant portions of his land to his own vassals (much as he himself held land of a superior lord), and could keep some for himself (Baker 1990, p. 255). I focus here on the land the lord retained — called the "demesne." ("Demesne" may be pronounced to rhyme with "demean" or to rhyme with "remain.") This could either be managed directly, through estate managers and hired labor, or it could be leased out to others for a limited time. Direct management and leasing coexisted throughout the Middle Ages on manorial demesnes, but the mix between these different modes of management changed over time.

Leasing was common in the twelfth century. Some sources suggest that it may even have increased during this time (see Postan 1953, pp. 359–62; Miller 1971, pp. 7–8; Faith 1994, p. 671; but see Bridbury 1978, pp. 505–09), but overall there does not seem to have been much movement. At the end of the twelfth century or sometime in the thirteenth century, lords turned increasingly toward direct management of demesnes. But this period of direct management was no more than "a substantial interlude in the age-long system of leasehold farming" (Miller 1971, p. 14). The fourteenth century saw a shift back toward leasing; the process had begun on some estates before the Black Death (1348), though on other estates the shift happened later in the century. From the 1370s on, leasing was more common than direct management (see Bolton 1980, p. 220), and by the mid-fifteenth century, direct management had been all but abandoned (Campbell 2000, pp. 3, 59–60).

Thus, in England, the chronology went through two distinct stages — an increase in direct management from about 1200 to the fourteenth century, and an increase in leasing thereafter. Table 1, from Poynder (2003, ch. 1.3), collects data on methods of demesne management on 42 estates.

There is some evidence that minor landlords were more likely to manage their lands directly than were major landlords, and that large landowners with many demesnes of differing sizes were more likely to lease their small demesnes than their large ones (Poynder 2003, ch. 1.3). (For a treatment of the direct management vs. leasing choice in historical fiction, see Shakespeare [1595, I.iv, II.i], Follett [1989, pp. 240-242], and Penman [2002, p. 151].)

On the Continent, there was no such decline and renewal of leasing. From a starting point of widespread direct management, the contract mix began to shift toward leasing in France, the Low Countries, and western Germany beginning in the late twelfth or early thirteenth century — just as England was moving toward direct management (see Ganshof and Verhulst 1966, pp. 322–27; Duby 1962, vol. 2, pp. 49–52, 151–53; Poynder 2003, ch. 1.3).

B Proposed explanations

The most common explanation among economic historians for the change in contract mix in medieval England has been movements in wages, grain prices, and rents. On one account, rising wages made direct management, with its demand for hired labor, more expensive relative to farms worked by family labor, and therefore decreased the amount of land under direct management (see, for example, Bolton 1980, pp. 208, 220; Campbell 2000, pp. 10, 59; Postan 1978, p. 522; Stacey 1986, p. 925; Ganshof and Verhulst 1966, p. 326). On another account, falling grain prices made production for the market less profitable, and therefore increased lords' willingness to rent their lands for cash (see, for example, Campbell 2000, p. 59; Mate 1983, p. 331; Postan 1978, p. 522). On a third account, rising land values, due to the pressure of population on land, made lords more willing to rent (see, for example, Campbell 2000, p. 232; Halcrow 1955, p. 355). Ups and downs in leasing are also attributed to the

price and wage stories together, more generally to ups and downs in economic conditions (with hard times associated with leasing), or simply to cash flow problems on the part of the lord (see, for example, Bolton 1980, pp. 45, 100, 188–89, 218–19; Campbell 2000, pp. 233–36, 431; Halcrow 1955, p. 348; Lomas 1978, p. 339; Langdon 1991, p. 437; Miller 1971, pp. 11–14; Du Boulay 1965, p. 444).

Many of the price-based explanations implicitly assume that lords, as direct managers, produced primarily for the market while peasants, as lessees, produced primarily for personal consumption (see Bolton 1980, pp. 45, 62; Campbell 2000, p. 203); but in fact, both lords and peasants had access to, and participated in, the market, and also produced for home consumption (see Campbell 2000, pp. 56, 194 tbl. 5.01, 196 tbl. 5.02, 200–03; Dyer 1989a, pp. 71–85; 1989b, pp. 305–06, 310; Epstein 1994, p. 474; Jones 1993). Also, these explanations generally do not explicitly include both risk aversion and moral hazard, without which price movements may not affect contract choice. More importantly, wages and rents are related variables that are determined simultaneously by the underlying parameters of the economy, so any satisfactory explanation relying on changes in wages and rents should explain, by reference to those parameters, why wages and rents changed as they did.

Palmer (1985) offers a monetary explanation and argues that twelfth-century inflation encouraged direct management (see also Dyer [1989a, p. 35], Bridbury [1978, p. 519], Reed and Anderson [1973, p. 136], and Duby [1962, vol. 2, p. 133]; but see Bolton [1980, p. 188], arguing that direct management is more beneficial during *deflation* because it avoids the problem of defaulting tenants). The inflation explanation implicitly assumes that indexation is impossible. But we do have examples of rental contracts where rents increased according to a predetermined schedule (see Bridbury 1978, p. 517; Miller 1971, pp. 4–5;

Halcrow 1955, pp. 348–49), and substantial evidence of rent payments in kind, which are a form of automatic indexation. Moreover, the inflation was not restricted to England (see Fischer 1996, p. 19).

Miller (1975, pp. 15–16) offers an institutional explanation and argues that fourteenth-century tax policy encouraged leasing. Others, notably Postan, have suggested that political turmoil may encourage leasing, though the chronologies of political turmoil and leasing do not line up neatly, either in England or on the Continent (see Postan (1956, p. 118; 1978, p. 522); Miller 1971, pp. 4–5; Bridbury 1978, pp. 504–05; Mate 1983, p. 334; Lomas 1978, p. 343). Duby (1962, vol. 2, pp. 138–39) suggested that direct management was a response to the English crown's appropriation of seignorial revenues in Henry II's time, though Poynder (2003, ch. 2.3) suggests that Duby's thesis may be empirically false, as English landlords may not have actually suffered a drop in revenue as a result of Henry II's reforms. Fenoaltea (1975b) presents a contract-theoretic explanation of the changes in contract mix based on two-sided moral hazard and the need to provide landlords with incentives to introduce agricultural innovations in the thirteenth century; but the same innovations were available and were in fact in greater use in western Europe during the thirteenth century, and moreover, it is uncertain whether the thirteenth century was really more innovative than other centuries (see Poynder 2003, ch. 2.2). Britnell (1993) gives a legal explanation of direct management, arguing that changes in property law made leases dangerous to landlords by threatening to convert them into inheritable tenancies, though his hypothesis only concerns life tenancies, and does not explain why lords did not switch to tenancies for terms of years, which were not similarly dangerous. (See also the interesting debate between North and Thomas [1971] and Fenoaltea [1975a] for institutional explanations of this phenomenon.)

Poynder (2003) has suggested a legal explanation of contract choice based on contract-theoretic considerations, among other factors. While I am indebted to him for his wealth of historical detail, and while his discussion is on the right track, my model differs from his explanation in a number of respects. First, his non-technical explanation, based on Barzel's informal property rights model, focuses on balancing the costs of "policing land," "policing labor," and "policing output" (Barzel 1997, p. 54; Poynder 2003, ch. 3.2). These categories are intuitively plausible, but Barzel's casual use of the terms without a formal model occasionally leads him astray.[1] Second, Poynder's economic analysis is not always sound, as when he problematically uses the frequency of success at trial as a sign of the effectiveness of a form of action (see Poynder [2003, ch. 4.2], in light of Kaplow and Shavell [2002, p. 1734 and n. 134]). Finally, I believe that my explanation is more parsimonious.

Among non-rational-choice explanations, some historians have suggested that feudal and ecclesiastical landowners had a noneconomic mentality (see Miller 1971, pp. 7–8, 13; Lomas 1978, p. 353). Others have told a story possibly consistent with bounded rationality — large estates were too large for landowners to keep track of profit on individual demesnes (see Lomas 1978, pp. 342, 352–53) — or other behavior stories — landowners who were busy acquiring new land did not care so much about maximizing their return from their existing land (see Miller 1971, pp. 7–8). Others have focused on the larger political model and suggest that leasing could have been a means of patronage (see Du Boulay 1965, p. 451; Harvey 1969, p. 24; Miller 1971, p. 5; Faith 1994, p. 659; Hare 1981, p. 1; Stacey 1986, p. 933). Evaluating these is beyond the scope of this paper.

III The baseline model with secure property rights

A Setup

I model the choice between direct management and leasing as a one-period game with two players, a lord and a peasant, who are both rational expected utility maximizers. The model in this section is based on the standard principal-agent model with risk aversion and moral hazard.

Agricultural production is a random variable equal to $q(e)\theta$, where $e \in \{e_L, e_H\}$ $(e_L < e_H)$ is unobservable productive effort, $q(e_L) \equiv q_L < q(e_H) \equiv q_H$, and θ is a random variable, bounded above 0, with mean 1 and absolutely continuous distribution (see Binswanger, Deininger, and Feder 1995, p. 2712; Otsuka, Chuma, and Hayami 1992, p. 1979; Eswaran and Kotwal 1985, p. 355). The harvest $q(e)\theta$ is sold on the market at a price p, so the revenue from the sale of agricultural produce is $pq(e)\theta$, the expected value of which is $pq(e)$.

The lord is risk-neutral and has a utility function Π that only depends on his profit x; thus, $\Pi(x) \equiv x$.

The peasant is risk-averse over income and has a utility function u that increases with net revenue y and decreases with effort e. I assume that u is additively separable in y and e; $u(y, e) \equiv Ev(y) - e$, where $v(y)$ is a von Neumann-Morgenstern utility function with constant relative risk aversion (and hence declining absolute risk aversion). Thus, $v'(y) > 0$, $v''(y) < 0$, and $-\frac{yv''(y)}{v'(y)} \equiv C$. The peasant will accept any offer the lord makes as long as it gives him utility greater than his reservation utility level $\bar{u}$.

The timing of the game is as follows:

- $t = 0$: The lord (whom I assume to have bargaining power) decides the contract type. I restrict attention to two types of contracts: direct management and leasing. Direct management is a contract under which the

lord pays the peasant a wage w and keeps the output. Leasing is a contract under which the peasant keeps the output and pays the lord a rent r.

- $t = 1$: The peasant chooses and expends e.
- $t = 2$: Uncertainty θ is resolved, and the output is grown and sold by its owner: by the lord in the case of direct management and by the peasant in the case of leasing.
- $t = 3$: The lord pays the peasant w in the case of direct management, or the peasant pays the lord r in the case of leasing.

B Solution with secure property rights

We solve the problem by backward induction.

At $t = 1$, the peasant chooses and expends e.

- In the case of direct management, the peasant will receive w. Because e is unobservable, w cannot depend on the choice of e. Therefore, the peasant chooses e to maximize $u(w, e) \equiv v(w) - e$, which is equivalent to minimizing e, the disutility of effort, that is, choosing $e = e_L$.
- In the case of leasing, the peasant will pay r. His net revenue is $pq(e)\theta - r$, so he chooses $e^*(r) \in \{e_L, e_H\}$ to maximize his expected utility $Eu(pq(e)\theta - r, e) \equiv Ev(pq(e)\theta - r) - e$.

Before we go on, we establish that, if a peasant finds himself faced with a lease, he tends to work harder when the rent is high. This makes sense, because the higher the rent, the more important it is for the risk-averse lessee to work hard to ensure that production is high enough to avoid the possibility of catastrophically low income.

Lemma 1 *For given q_L, q_H, and r, there is a threshold $\bar{e}$ such that, under a leasing contract, the peasant chooses e_H when $e_H < \bar{e}$ and chooses e_L when $e_H > \bar{e}$.*

Proof. See Appendix A. ■

Lemma 2 *The peasant's threshold $\bar{e}$ (as defined in Lemma 1) is an increasing function of r.*

Proof. See Appendix B. ■

Proposition 1 *The peasant's effort under leasing, $e^*(r)$, is a nondecreasing function of r.*

As Proposition 1 follows directly from Lemmas 1 and 2, I omit the proof. Moving backwards, at $t = 0$, the lord is faced with two possible contracts.

- If the lord chooses direct management, his utility is $pq_L - w$. He must offer a wage w that satisfies:

$$u(w, e_L) \equiv v(w) - e_L \geq \bar{u} \Rightarrow w \geq v^{-1}(\bar{u} + e_L). \tag{1}$$

  Choosing w to maximize $pq_L - w$ is equivalent to minimizing w, so the lord sets $w = v^{-1}(\bar{u} + e_L)$, for a utility under direct management of $\Pi = pq_L - v^{-1}(\bar{u} + e_L)$.

- If the lord chooses leasing, his utility is $\Pi = r$. The lord must offer a rental rate r that satisfies:

$$u(pq(e^*(r))\theta - r, e^*(r)) \equiv Ev(pq(e^*(r))\theta - r) - e^*(r) \geq \bar{u}. \tag{2}$$

  Since higher r increases the lord's utility from leasing and decreases the tenant's utility, the lord will seek to make this condition hold with equality.

This implies either $Ev(pq_L\theta - r) - e_L = \bar{u}$ or $Ev(pq_H\theta - r) - e_H = \bar{u}$. Denote the values of r that satisfy these equations as $r(e_L)$ and $r(e_H)$, respectively. By Proposition 1, $r(e_H)$ implements e_H iff $e_H < \bar{e}(r(e_H))$. Otherwise, e_H is just too high to make high effort levels worthwhile, and leasing is incapable of motivating high effort. Therefore, I assume that $e_H < \bar{e}(r(e_H))$, so that the contract choice corresponds to a choice of effort levels. We thus have $r = r(e_H)$, or $Ev(pq_H\theta - r) - e_H = \bar{u}$.

Thus, the lord chooses which contract to adopt by comparing $pq_L - v^{-1}(\bar{u} + e_L)$ with r. The contract choice depends on the sign of:

$$\Delta \equiv r - pq_L + v^{-1}(\bar{u} + e_L) \tag{3}$$

(the relative advantage of leasing), subject to:

$$Ev(pq_H\theta - r) - e_H = \bar{u}. \tag{4}$$

When effort is not highly productive, the lord prefers direct management. In the extreme case when $q_L = q_H$:

$$\begin{aligned} \bar{u} + e_H = Ev(pq_H\theta - r) = Ev(pq_L\theta - r) < v(pq_L - r) \\ \Longrightarrow v^{-1}(\bar{u} + e_H) < pq_L - r \\ \Longrightarrow r < pq_L - v^{-1}(\bar{u} + e_H) < pq_L - v^{-1}(\bar{u} + e_L) \\ \Longrightarrow \Delta \equiv r - pq_L + v^{-1}(\bar{u} + e_L) > 0. \end{aligned} \tag{5}$$

This makes sense, since incentives for effort are unimportant here, and optimal insurance dictates that the risk-averse party's compensation should be constant. Conversely, it is clear that as $q_H \to \infty$, $\Delta > 0$ and so the lord prefers leasing. There is therefore a range of values of q_L near q_H such that direct management

is optimal, and a range for which leasing is optimal.

Indeed, it is immediately evident why minor landlords are more likely to directly manage their demesnes than are larger landlords. Smaller estates face lower total monitoring costs, so even without the incentives that leasing provides, minor landlords can enforce a higher e_L, which corresponds to a higher q_L. Also, it is evident why, holding the total size of the landlord's holdings constant, a lord is more likely to lease the smaller component demesnes of his estate: It is administratively inconvenient to set up a separate monitoring system for small demesnes, so monitoring costs for small enough demesnes may be too high to make monitoring worthwhile. Thus, e_L is lower for such small component demesnes, which makes q_L lower.

More generally, fields may differ in their level of q_L, a random variable distributed over the interval (ξ, q_H), where $\xi > 0$, with absolutely continuous distribution function Φ. The realization of q_L is known to both lords and peasants at $t = 0$, so lords choose contract type optimally given q_L. Then the proportion of fields leased at any time is:

$$\begin{aligned}\Psi \equiv \Pr(\Delta > 0) &= \Pr(pq_L < r + v^{-1}(\bar{u} + e_L)) \\ &= \Pr\left(q_L < \frac{r + v^{-1}(\bar{u} + e_L)}{p}\right) = \Phi\left(\frac{r + v^{-1}(\bar{u} + e_L)}{p}\right). \qquad (6)\end{aligned}$$

C The effect of rising living standards

The first result is that, in this model, leasing increases as $\bar{u}$ increases. The reservation utility $\bar{u}$ — the value of peasants' "outside option" — is essentially a measure of their standard of living. We can get at this by examining material evidence of rising living standards like diet, house quality, or health, or by looking at real wages of peasants — since $w = v^{-1}(\bar{u} + e_L)$, w varies together with $\bar{u}$ — or real wages in other professions, which were, to some extent, available

to peasants, and which in practice tended to vary together with agricultural wages.

The following proposition shows that if e_H is not too large, that is, if the high effort level is not too onerous, rising living standards make rental contracts more attractive.

Proposition 2 *If the disutility of effort is not too high, leasing becomes more common as living standards increase. That is, for any $\bar{u}$, there exists a maximum disutility of effort $\hat{e}(\bar{u})$ such that $\frac{\partial \Psi}{\partial \bar{u}} > 0$ for all $e_H \in (e_L, \hat{e}(\bar{u}))$.*

Proof. See Appendix C. ■

The intuition of the preceding is clear. As peasants' reservation utility increases, the lord is constrained to offer contracts that leave them better off. Because peasants have constant relative risk aversion and therefore declining absolute risk aversion, they are less risk-averse at higher utility levels, so the insurance function of wage contracts becomes less important and the incentive function of rental contracts becomes more important. This intuition breaks down for high enough disutility of effort, when it is just no longer worthwhile to try to provide incentives for high effort.

Unfortunately, data on wages or other evidence of living standards is insufficient to satisfactorily explain the evolution of contract form in England, and it is only roughly consistent with the evolution on the Continent because it is highly fragmentary, somewhat contradictory, and inconclusive.

In England, according to Farmer's wage series, over the relevant period, agricultural wages were roughly stagnant from 1208 to 1250, falling from about 1250 to 1270, stagnant again until about 1330, and rising steadily and significantly thereafter (see the graph of the twenty-year moving average of agricultural wages in Figure 1). Dyer's account is consistent: wages were declining or stagnant

from 1200 to 1320 and rising from 1320 through the end of the fourteenth century (Dyer 1989a, p. 218). And another price series shows that the purchasing power of agricultural laborers' day wages in England fell until the 1310s, and then roughly rose through 1500 (Clark 2007, pp. 99–100, 104 fig. 2). Building workers' real wages, on average, increased from 1264 to the late fourteenth century (Dyer 1989a, p. 217 fig. 8; see also Abel 1980, p. 33 tbl. 6), and building wages were in some measure available to agricultural workers. (See also Clark [2007, p. 109 fig. 4], showing that agricultural and building wages roughly moved together, and see Abel [1980, p. 54, tbl. 9] for the increase in English artisans' and laborers' wages from about 1300 to about 1450.) Some material evidence of peasant living standards also suggests that peasants were becoming better off in the thirteenth century: House quality was improving (Dyer 1989a, p. 166) and peasant diets were improving at least from 1250 on in England (Dyer 1989a, pp. 158–59).

For England, it is thus defensible to say that we have mostly decline or stagnation from 1200 to about 1310–30, and increase afterward, though on some accounts the increase began earlier. This is consistent with the chronology of contract form, with direct management increasing from around 1200 to sometime in the fourteenth century (before the Black Death in some areas), and leasing increasing thereafter. But this consistency was somewhat easy to come by, since I was able to opportunistically lump periods of stagnation in real wages together with a period of decline (one that may have been fairly brief) for purposes of explaining the increase in direct management. Moreover, 1310–30 is somewhat on the early side with respect to the renewed trend toward leasing (to say nothing of earlier times), so one may legitimately object that real wages were already rising at the tail end of the direct management period. One would like a better explanation of why direct management was increasing even when

the chart of real wages shows stagnation and some accounts show increase.

What about the Continent? Unfortunately, wage data for the Continent is nowhere near as good as for England. In particular, I have found no good evidence on real wage movements on the Continent in the thirteenth century, so I can only go on highly fragmentary evidence from different areas, mostly biased toward the end of this period. "Climate improved, reaching its optimum between 1150 and 1300. This made previously infertile soils tillable and drastically reduced the frequence of crop failures to one year in twenty, even in upland areas" (Genicot 1990, p. 31). Dyer's evidence on peasant diets (1989a, pp. 158–59) applies not only for England but also throughout western Europe. Abel's discussion (1980, pp. 31–34) suggests that at least in Germany, the better-off farmers were also experiencing rising living standards, and that in Germany and France, wages began to rise in the thirteenth century. In western and Central Europe, real wages (expressed in terms of grain) definitely increased from about 1350 to about 1500 (Abel 1980, p. 52, fig. 10). Real wages in Navarre rose from 1350 to 1405, and fell only slightly from 1405 to 1445, and real day-rates at Klosterneuburg rose between 1410 and 1500 (Genicot 1966, pp. 690–91 tbls. 14 and 16). Between 1350–99 and 1450–99 (or between 1400–49 and 1450–99, depending on how much data is available), the conditions of building craftsmen and laborers seem to have improved not only in London but also in Paris and Strasbourg (Allen 2001, p. 429 figs. 7–8; Allen n.d.). And data from archeological excavations suggests that, in Central and Western Europe, heights increased from the twelfth to the thirteenth, the thirteenth to the fourteenth, and the fourteenth to the fifteenth, centuries, which indicates rough increases in living standards (Koepke and Baten 2005, p. 75 tbl. 3).

The evidence is far from conclusive and some of it is contradictory. For

instance, in Italy, masons' real wages in Tuscany in about 1300–1500 seem to have exhibited no real trend at all (Malanima 2004, pp. 23–29); Fischer suggests that real wages in western Europe fell by 25–40% from 1220 to 1320, though as to the Continent, he only seems to be relying on Abel (Fischer 1996, pp. 26, 325 n. 35). The same Allen data quoted above shows that craftsmens' and laborers' wages roughly stagnated in northern Italy; exhibited no trend in Antwerp and Valencia; and declined in Vienna and Krakow (though central and Eastern Europe are somewhat beyond the scope of this paper) (Allen 2001, p. 429 figs. 7–8; Allen n.d.).

Overall — and thanks, in no small measure, to the absence of good and consistent data, especially at the beginning of the period — the view that, on the Continent, the prospects of the peasants described in this model roughly improved is defensible. Thus, one can explain the general Continental trend toward a greater proportion of rental contracts over the course of the Middle Ages by a general increase in peasants' reservation utility. The main phenomenon that trends in living standards do not explain is England, where living standards were stagnant or rising for some of the time that direct management was increasing, and then continued to rise as the trend toward direct management reversed itself.

Note that:

$$\frac{\partial \Psi}{\partial p} = \frac{\partial}{\partial p}\Phi\left(\frac{r + v^{-1}(\bar{u} + e_L)}{p}\right) = \frac{\Phi'}{p^3} \cdot (\frac{\partial r}{\partial p}p - r - v^{-1}(\bar{u} + e_L)), \tag{7}$$

and

$$\frac{\partial r}{\partial p} = q_H \cdot \frac{Ev'(pq_H\theta - r)\theta}{Ev'(pq_H\theta - r)}; \tag{8}$$

the sign of $\frac{\partial \Psi}{\partial p}$, which is the same as the sign of

$$\Gamma_p \equiv pq_H Ev'(pq_H\theta - r)\theta - (r + v^{-1}(\bar{u} + e_L))Ev'(pq_H\theta - r), \tag{9}$$

seems ambiguous. The explanations that rest on price changes thus seem dubious. Rent is an endogenous variable here that depends on p, q_H, and e_H, so within this model it does not make sense to talk directly of the effect of increasing rent.

Also, note that:

$$\frac{\partial \Psi}{\partial q_H} = \frac{\Phi'}{p} \cdot \frac{\partial r}{\partial q_H}, \tag{10}$$

and

$$\frac{\partial r}{\partial q_H} = \frac{Ev'[(pq_H\theta - r)p\theta]}{Ev'(pq_H\theta - r)} > 0, \tag{11}$$

so $\frac{\partial \Psi}{\partial q_H} > 0$. That is, increases in q_H — in agricultural productivity that increase the return to high effort relative to low effort — can also explain the general increase in leasing. This makes sense because increases in q_H make incentives for high effort important. There is some evidence that agricultural productivity improved, though again the evidence is not clear-cut (compare Genicot 1990, p. 42–48, with Campbell 2000, p. 371 tbl. 7.12).

IV Insecure freehold property rights

A The evolution of freehold property rights

In the Middle Ages, the concept of "property rights" in the modern, absolute sense did not exist. Instead, there was feudal tenure: Everyone with land, except the king, was someone's "tenant" and "held" land of their lord. "Feudal tenure was the antithesis of ownership as we know it. Before the advent of the

common law, the tenant enjoyed few of the privileges which we now attribute to an owner. He could not do what he liked with the land. He could not sell it without the lord's consent. He could not pass it on to others by will, and there was no legally enforceable right of succession in his family after his death. His only protection against dispossession by the lord was the lord's moral or social obligation to protect his own men. The tenant's interest therefore stopped short at possession, which is a fact and not a legal right" (Baker 1990, pp. 257–58, 262).

This sort of lifelong status, when enjoyed by a free man, was called "freehold" (Baker 1990, p. 296). (Freehold is thus distinct from tenure for a period of years, which is a form of leasehold.) Tenants' interests were protected to some degree by the lord's court's application of manorial custom, but one could not always rely on the lord's own courts if one wanted to sue the lord himself. In the reign of Henry II, in the second half of the twelfth century, the royal courts stepped in — at first, to restore the holdings of those displaced in the civil war of Stephen's reign (1135–54) — by issuing "writs" to order lords to accept aggrieved tenants.

The first such writ was the "writ of right," forced the lord, after an inquiry into history, to accept a tenant with hereditary right. The writ of right "was designed to settle the ultimate right for all eternity, through the solemnities of judicial combat" (Baker 1990, p. 266). More speedy remedies — the so-called "petty assizes," which did not rely on combat — followed soon after: The assize of "novel disseisin," established around the 1160s, improved the security of freehold tenure by reinstating plaintiffs who had been recently dispossessed "unjustly and without judgment," and the assize of "mort d'ancestor," established around the 1170s, improved the heritability of freehold tenure by putting plaintiffs in possession if they were the heir of someone who had been in possession

when he died. Lords could fight back with procedural devices of their own, such as "writs of entry," invented in the very late twelfth to early thirteenth century, which allowed lords to explain why the plaintiff's claimed right was invalid. For instance, in response to a plaintiff's writ of novel disseisin, lords could use the writ of entry called *ad terminum qui preteriit* ("for the term that ran out") to argue that the plaintiff had been a tenant for a term of years whose term had run out.

Through the thirteenth and fourteenth centuries, the assize of novel disseisin expanded continuously, and after 1400, other personal actions, such as trespass, were also used. But the main writs had been created by the thirteenth century. These writs, combined with the falling price of litigating freehold property rights, are generally considered to have gradually made freehold tenure more secure.

The next sections explain why we can expect this to lead to more direct management.

B Setup

The basic parameters of the model are the same as before. The game is expanded, with the following timing:

- $t = 0$: The lord, as before, decides the contract type, and offers a wage w if the contract type is direct management or a rental rate r if the contract type is leasing.
- $t = 1$: The peasant, as before, chooses and expends an unobservable effort level e.
- $t = 2$: Someone tries to expropriate the lord. This person may either be a stranger or the lord's own lord. (The attempt need not be malicious: the lord's lord or third party may sincerely believe that he has a right to

evict the lord.) This attempt fails (that is, the lord's freehold property rights are secure) with probability π_F (F stands for "freehold"). With probability $1-\pi_F$, the lord leaves the game with utility v_0, and the new lord evicts the lessee or fires the worker, who leaves the game with utility u_0.

- $t=3$: Uncertainty θ is resolved, and if the lord was not expropriated, the output is grown and sold by the lord in the case of direct management, and by the peasant in the case of leasing.

- $t=4$: If the lord was not expropriated, he pays the peasant w in the case of direct management, or the peasant pays the lord r in the case of leasing.

C Solution with insecure freehold property rights

We solve the problem by backward induction.

At $t=1$, the peasant chooses his effort level.

- Under direct management, he again chooses $e=e_L$.

- Under leasing, he chooses $e^*(\pi_F, r) \in \{e_L, e_H\}$ to maximize his expected utility $\pi_F Ev(pq(e)\theta - r) + (1-\pi_F)u_0 - e$.

At $t=0$, the lord chooses the contract type.

- If he chooses direct management, his expected utility is $\pi_F[pq_L - w] + (1-\pi_F)v_0$. He sets a wage w to satisfy:

$$\begin{aligned} \pi_F v(w) + (1-\pi_F)u_0 - e_L &= \bar{u} \\ \Rightarrow w = v^{-1}&\left(\frac{\bar{u} + e_L - (1-\pi_F)u_0}{\pi_F}\right), \end{aligned} \tag{12}$$

so his expected utility under direct management is:

$$\Pi = \pi_F \left[pq_L - v^{-1} \left(\frac{\bar{u} + e_L - (1-\pi_F)u_0}{\pi_F} \right) \right] + (1-\pi_F)v_0. \tag{13}$$

- If he chooses leasing, his expected utility is:

$$\Pi = \pi_F r + (1-\pi_F)v_0, \tag{14}$$

where r satisfies:

$$\pi_F Ev(pq(e^*(\pi_F, r))\theta - r) + (1-\pi_F)u_0 - e^*(\pi_F, r) \geq \bar{u}. \tag{15}$$

As before, the lord will seek to make this condition hold with equality, and we assume that $e_H < \bar{e}(r(e_H, \pi_F))$ (a threshold defined analogously to the one in Lemma 1) over the relevant range of π_F. So the lord chooses a rental rate r that satisfies $\pi_F Ev(pq_H\theta - r) + (1-\pi_F)u_0 - e_H = \bar{u}$ and implements effort level e_H.

Thus, the lord chooses which contract to adopt by comparing $\pi_F[pq_L - v^{-1}(\frac{\bar{u}+e_L-(1-\pi_F)u_0}{\pi_F})] + (1-\pi_F)v_0$ with $\pi_F r + (1-\pi_F)v_0$. The contract choice depends on the sign of:

$$\begin{aligned} \Delta_1 &\equiv \pi_F r + (1-\pi_F)v_0 - \pi_F[pq_L - v^{-1}(\frac{\bar{u}+e_L-(1-\pi_F)u_0}{\pi_F})] - (1-\pi_F)v_0 \\ &= \pi_F(r - pq_L + v^{-1}(\frac{\bar{u}+e_L-(1-\pi_F)u_0}{\pi_F})) \end{aligned} \tag{16}$$

(the relative advantage of leasing), subject to:

$$\pi_F Ev(pq_H\theta - r) + (1-\pi_F)u_0 - e_H = \bar{u}. \tag{17}$$

The proportion of leasing is:

$$\Psi_1 \equiv \Pr(\Delta_1 > 0) = \Pr\left(pq_L < r + v^{-1}\left(\frac{\bar{u} + e_L - (1-\pi_F)u_0}{\pi_F}\right)\right)$$
$$= \Phi\left(\frac{r + v^{-1}(\frac{\bar{u}+e_L-(1-\pi_F)u_0}{\pi_F})}{p}\right). \tag{18}$$

(It is easy to check in this expanded model that the inclusion of π_F does not change the the baseline result of Proposition 2: If e_H is not too high, increasing $\bar{u}$ increases leasing. Simply repeating the steps of Proposition 2 and substituting appropriately, we have:

$$\frac{\partial \Psi_1}{\partial \bar{u}} = \frac{\Phi'}{\pi_F p} \cdot \frac{v'(v^{-1}(\frac{\bar{u}+e_L-(1-\pi_F)u_0}{\pi_F})) - Ev'(pq_H\theta - r)}{v'(v^{-1}(\frac{\bar{u}+e_L-(1-\pi_F)u_0}{\pi_F}))Ev'(pq_H\theta - r)}. \tag{19}$$

This depends on the sign of $v'(v^{-1}(\frac{\bar{u}+e_L-(1-\pi_F)u_0}{\pi_F})) - Ev'(pq_H\theta - r)$, which, by examining the rent-determination constraint (equation (17)) when $e_H = e_L$, we know is positive over some range of e_H near e_L.)

D The effect of increased freehold protection

The next proposition shows that as freehold property rights become more secure, we should expect to see more direct management.

Proposition 3 *If the disutility of effort is not too high, and as long as $u_0 < \bar{u} + e_L$ (that is, provided the peasant's dispossession utility is low enough), direct management becomes more common as freehold property becomes more secure. That is, for any $\pi_F > 0$, there is a maximum disutility of effort $\hat{e}(\pi_F)$ such that $\frac{\partial \Psi_1}{\partial \pi_F} < 0$ for $e_H \in (e_L, \hat{e}(\pi_F))$.*

Proof. See Appendix D. ■

This result may seem surprising, since increasing π_F improves the lord's ability to profit from his land in any way he chooses. He is more likely to both keep his profits from direct management and collect his rents from leasing. And peasants are better off because they have greater job security or leasehold security; so the lord can get away with paying a lower wage or charging a higher rent. So one might think that the profit from both modes of management would rise equally.

But changes in π_F, through the workers' and lessees' participation constraints, affect the wage and rental rates differently. Increased security has a greater effect on the wage worker. Without the danger of his employer's expropriation, he is fully insured, enjoying a fixed level of utility $\bar{u}$; increased security for the lord thus removes the peasant's sole source of insecurity. The lessee, on the other hand, is still subject to the variability of the harvest, and even if his lord's tenure becomes more secure, the lessee may still do very badly in a bad year. Thus, with greater security, the wage worker benefits more; so the lord can save more by cutting workers' wages than he can gain by increasing lessees' rents.

Is this result robust? The assumption that the interloping lord would evict the lessee and fire the worker is admittedly extreme. Lessees did suffer from their lord's insecure property rights, since their own leasehold was only a personal contract with the lord, and we know that lords seeking to escape a bad deal would sometimes enter into collusive arrangements with "interlopers" to evict their lessee. Poynder (2003, ch. 4.2), for instance, gives the example of two sisters who recovered their late father Thomas's land from their uncle Ranulf in 1236 by an action of mort d'ancestor, and who promptly evicted Hunfrid, who had been Thomas's lessee for a term of years. Such actions of recovery may have been collusive, that is, designed to evict lessees, especially before the

common law provided specific sanctions against collusive recoveries. (See also Hudson [1994], arguing that a lord's forfeiture was especially hazardous for his sub-tenants between the late eleventh and late twelfth centuries.) Even if the lessee retained the right to "emblements," that is, the right to collect the crop he had planted — which was not always clear (see Holdsworth [1942] 1966, vol. 3, p. 125 and n. 3) — it is reasonable to suppose that an evicted lessee was worse off than a non-evicted one. And even if an interloping lord decided to keep the previous lord's lessee in place, he could still renegotiate the rent on unfavorable terms to the lessee, who had now expended effort and would be unwilling to walk away from his leasehold. But surely an interloping lord did not always evict the original lord's lessees and fire his workers, or even necessarily mistreat them. He may not always have had his own people to establish instead, and he may have preferred to leave the original workers and lessees in place to induce them to work for him or rent from him later on.

But this result does not depend on such a strong assumption. If we assume that interloping lords, instead of evicting lessees or firing workers with certainty, only do so with probability γ (and honor their predecessors' wage and lease contracts with probability $1-\gamma$), then the same result holds for any $\gamma > 0$. (Essentially, in the worker's and lessee's participation constraints (equations (12) and (17)), π_F becomes $\pi'_F = \pi_F + (1-\pi_F)(1-\gamma) = 1-\gamma+\pi_F\gamma$, so $\frac{\partial \Psi_1}{\partial \pi'_F} = \frac{\partial \Psi_1}{\partial \pi_F}\frac{\partial \pi_F}{\partial \pi'_F} = \frac{1}{\gamma}\frac{\partial \Psi_1}{\partial \pi_F}$, which has the same sign as $\frac{\partial \Psi_1}{\partial \pi_F}$ as long as $\gamma > 0$. If $\gamma = 0$, that is, if interlopers *always* respect their predecessors' contracts, then changes in freehold protection do not change rents or wages, since dispossession never hurts peasants; then, profits from direct management and from leasing change equally with changes in π_F, and $\frac{\partial \Psi_1}{\partial \pi_F} = 0$.) The model is also robust to having different probabilities of firing workers (say γ_w) and evicting lessees (say γ_r), as long as the difference between the two probabilities is not too great.

V Insecure leasehold property rights

The two forces already discussed are sufficient. Increasing $\bar{u}$ already makes leasing go up, so we should definitely see leasing increase in the fourteenth century, once p_F had stabilized and $\bar{u}$ was, by all accounts, increasing. But in addition, the increasing security of leasehold tenure can explain the renewed movement toward leasing.

A The evolution of leasehold property rights

Before 1290, a common way of renting out one's land was called the "fee farm" or *firma*. A lord would subinfeudate a portion of his property — that is, he would become his tenant's lord — in exchange for money. The statute *Quia emptores* in 1290 ended subinfeudation. From then on, one could still proceed through "substitution" — that is, the tenant would take one's place as one's lord's vassal with respect to the land in question. Substitution is roughly similar to a land sale — it requires one to part with one's land permanently, and this might be undesirable to many lords, since land was a popular store of value as well as a source of political power. Thus, as an alternative, the lease grew in popularity (Baker 1990, pp. 337–39).

The protection of leaseholds in the English common law lagged far behind the protection of freeholds. Leaseholds were considered personal property, not real property, and the remedy for their infringement was money damages, not restitution of the leasehold; and consequently, leaseholds lay outside the reach of the real actions described in the previous section.

From the late twelfth century on, lessees could enforce their leases against their lords by the writ of covenant, which was invented in the twelfth century and became common in royal courts around 1220–30. But the writ of covenant

was probably only effective against the lord personally (and possibly not against the lord's heir or an interloping lord), and specific performance (i.e., forcing the landlord to readmit the lessee, instead of merely requiring payment of money damages) was not always available (see generally Biancalana 2002; Arnold 1976, pp. 323–30; Ibbetson 1986; McGovern 1976). Over the course of the thirteenth century, lessees were given certain other protections. For instance, the writ *quare ejecit infra terminum* ("because he ejected within the term") protected them against early eviction by the lessor's alienee, but it probably did not protect them against eviction by a stranger (see Holdsworth [1942] 1966, vol. 3, pp. 213–17; Bracton [c. 1230] 1997, f. 220, vol. 3, p. 161; Donahue 1996, pp. 175–76), nor did it protect them against breaches of the agreement that fell short of actual eviction. Also, the Statute of Gloucester in 1278 protected the lessee from being evicted through the collusive use of a real action (as in the case of Ranulf's nieces described above).

But leasehold protection accelerated rapidly starting in the fourteenth century. The ejectment action (*de ejectione firmae*), a species of the writ of trespass, emerged during the reign of Edward II or Edward III (Holdsworth 1942 [1966], vol. 3, p. 214; Donahue 1996, p. 175). The availability of this action increased lessees' protection, though we are still somewhat unsure exactly who it was available against and what the precise remedy was (see *Brancaster v. Master of Royston* [1383]; Donahue 1996, p. 175). The ejectment action eventually came to eclipse the *quare ejecit* action, probably because it was available against more people — by 1500, it was definitely available against all strangers to the lease (the writ of covenant was used against lessors themselves). By 1600, protections for the freeholder and for the leasehold had converged, and in fact, even freeholders were using fictitious ejectment actions to litigate their rights to property because the freehold actions were less convenient.

B Setup

The game is similar to the game with insecure freehold property rights:

- $t = 0$: The lord, as before, decides the contract type, and offers a wage w if the contract type is direct management or a rental rate r if the contract type is leasing.

- $t = 1$: The peasant, as before, chooses and expends an unobservable effort level e.

- $t = 2$: In the case of leasing, the lord tries to expropriate the peasant. (As before, the attempt need not be malicious; and indeed, it is probably better to assume it was not, since in reality, lords were in repeat games with many lessees and thus would not want to expropriate their lessees maliciously.) This attempt fails (that is, the lessee's rights are secure) with probability π_L (L stands for "leasehold"). With probability $1 - \pi_L$, the peasant leaves the game with utility u_0, and the lord replaces him with another lessee on the same terms.

- $t = 3$: Uncertainty θ is resolved, and the output is grown and sold by its owner: by the lord in the case of direct management, by the original peasant in the case of leasing where the expropriation was unsuccessful, or by the replacement peasant in the case of leasing where the expropriation was successful.

- $t = 4$: The lord pays the peasant w in the case of direct management, or the peasant currently subject to the lease pays the lord r in the case of leasing.

C Solution with insecure leasehold property rights

We solve the problem by backward induction.

At $t = 1$, the peasant chooses his effort level.

- Under direct management, he again chooses $e = e_L$.
- Under leasing, he chooses $e^*(\pi_L, r) \in \{e_L, e_H\}$ to maximize his expected utility $\pi_L Ev(pq(e)\theta - r) + (1 - \pi_L)u_0 - e$.

At $t = 0$, the lord chooses the contract type.

- If he chooses direct management, his expected utility is $pq_L - w$. He sets a wage w to satisfy:

$$v(w) - e_L = \bar{u} \Rightarrow w = v^{-1}(\bar{u} + e_L), \tag{20}$$

so his expected utility under direct management is:

$$\Pi = pq_L - v^{-1}(\bar{u} + e_L). \tag{21}$$

- If he chooses leasing, his expected utility is $\Pi = r$, where r satisfies:

$$\pi_L Ev(pq(e^*(\pi_L, r))\theta - r) + (1 - \pi_L)u_0 - e^*(\pi_L, r) \geq \bar{u}. \tag{22}$$

As before, the lord will seek to make this condition hold with equality, and we assume that $e_H < \bar{e}(r(e_H, \pi_L))$ (a threshold defined analogously to the one in Lemma 1) over the relevant range of π_L. So the lord chooses a rental rate r that satisfies $\pi_L Ev(pq_H\theta - r) + (1 - \pi_L)u_0 - e_H = \bar{u}$ and implements effort level e_H.

Thus, the lord chooses which contract to adopt by comparing $pq_L - v^{-1}(\bar{u} + e_L)$ with r. The contract choice depends on the sign of:

$$\Delta_2 \equiv r - pq_L + v^{-1}(\bar{u} + e_L) \tag{23}$$

(the relative advantage of leasing), subject to:

$$\pi_L Ev(pq_H\theta - r) + (1 - \pi_L)u_0 - e_H = \bar{u}. \tag{24}$$

The proportion of leasing is:

$$\begin{aligned} \Psi_2 &\equiv \Pr(\Delta_2 > 0) = \Pr(pq_L < r + v^{-1}(\bar{u} + e_L)) \\ &= \Phi\left(\frac{r + v^{-1}(\bar{u} + e_L)}{p}\right). \end{aligned} \tag{25}$$

As before, it is easy to check that the inclusion of π_L does not change the result of Proposition 2 that, over some range of e_H, increasing $\bar{u}$ makes rental contracts more advantageous for the lord.

D The effect of increased leasehold protection

The next proposition shows that as leasehold property rights become more secure, we should expect to see more leasing.

Proposition 4 *If dispossession makes the lessee worse off than a secure leasehold, leasing becomes more common as leasehold property becomes more secure. That is, if* $u_0 < \bar{u} + e_H$, $\frac{\partial \Psi_2}{\partial \pi_L} > 0$.

Proof. See Appendix E. ■

This last result — that increased security of leasehold tenure increases leasing — is intuitively clear. This game assumes that $\pi_F = 1$, that is, that freehold

property rights protection is absolute, but is easy to check that the result is robust to assuming any $\pi_F > 0$ and (in the notation of the freehold section) any $\gamma > 0$.

VI Law on the Continent

The Continent, of course, does not present a unified legal picture as England does. But, as an initial matter, we may state the obvious: The developments in English law discussed above did not occur on the Continent (see, for example, Gouron [1990] 1993, ch. XXI, p. 207).

In some parts of Europe, particularly northern France and Spain, local customs prevailed — often emanating from the local lord in areas of seignorial jurisdiction (see Bellomo 1995, p. 103). These customs were only occasionally, and often imperfectly, supplemented or supplanted by royal enactments from local monarchs. In other parts, Roman law, as interpreted by scholarly commentators of the time, prevailed, under the name "learned law," "written law," or *ius commune* (see Caenegem 1992, pp. 67–69, 72; Bellomo 1995, pp. 78–111; Gouron [1990] 1993, ch. XXI, pp. 208, 214; Donahue 2004, pp. 31, 33). These areas included Italy, where Roman law was rediscovered in the twelfth century, and the south of France, below a "sinuous line following the forty-eighth parallel" (Bellomo 1995, p. 102). "In some areas of the Mediterranean world, learned law was adopted as early as the thirteenth century as the basis of the legal system. In these areas, the customs and ordinances peculiar to each country or city were regarded as local variants, which were of course valid but were of limited application and were anyway subject to the general rules of the learned law" (Caenegem 1992, pp. 67–68; see also Bellomo 1995, p. 102). In the lands of the Holy Roman Empire, custom dominated — even though "the emperors considered themselves the successors of the Christian *principes*

of ancient Rome" (Caenegem 1992, p. 72) — until Roman law was formally received in 1495 (Bellomo 1995, p. 109).

The English central royal courts were trying to enforce traditional notions of feudal justice — for instance, no one was to be dispossessed "unjustly and without judgment." But they did so not only by establishing a royal forum and procedures but also, and importantly, by elaborating a detailed system of centralized *substantive* law — for instance, by specifying under what circumstances an heir was to be admitted to property under the assize of mort d'ancestor. This centralized law evolved idiosyncratically and by fits and starts, with, as described above, freehold tenure acquiring greater protection in the later twelfth and thirteenth centuries, and protection of leasehold tenure lagging behind freehold tenure and accelerating rapidly in the fourteenth century.

By contrast, on the Continent, to the extent customary law was being applied, there was no centralized system of substantive law (see, for example, Lot and Fawtier 1958, vol. 2, p. 294). For instance, "[a]t the Parlement de Paris, the councillors were obliged to judge appeals from these regions according to the customs of the region and not according to the learned law. In 1278 Philip III even prohibited advocates from citing Roman law in cases coming from the regions of customary law" (Caenegem 1992, p. 81). Nor — since these customs were not even written down systematically — is there any particular reason to believe the law as to ownership and leasing followed any specific time trend. And to the extent Roman law was being applied, the law as to ownership and leasing had already been fairly well developed in the original sources by the Romans themselves (see Nicholas [1962, pp. 98–157, esp. pp. 140–53] for a discussion of Roman property law, and specifically *iura in re aliena*, which is the closest Roman analogue to English leaseholds).

VII Sharecropping

There remains a major unresolved issue. This model has assumed that rental contracts charged a fixed amount r, rather than, say, a share of the crop. This arrangement, now called sharecropping, was called "champart" in medieval England, and is seen occasionally in thirteenth- and fourteenth-century sources (Stacey 1986, p. 924; *Close Rolls 1237–1242* [1911] 1970, p. 142; Hilton 1990, pp. 512–15; *Annales Monastici* 1869, vol. 4, pp. 422–23; Coss 1975, p. 13; Harvey 1977, pp. 138 n. 1, 320; Hilton 1966, p. 108; Homans 1941, pp. 202, 443 n. 10; *Cartulary of Cirencester Abbey* 1964, vol. 2, p. 580). It was fairly rare, though it did occur sometimes, especially when peasants holding unfree tenures leases land to one another on a secondary market (see Hilton 1990, pp. 512–15).

Why there was so little sharecropping in medieval England — though it was widespread on the Continent (Ganshof and Verhulst 1966, pp. 324–25; *Les revenus de la terre* 1987; Duby 1962, vol. 2, p. 154) is a puzzle. Reed and Anderson (1973, p. 136 n. 6) and North and Thomas (1971) merely say that sharecropping had no precedent in the customs of the manor and would have been costly to introduce, but this is hard to square with the prevalence of the practice elsewhere in Europe and its occasional occurrence in England. More generally, the assumption of inflexible terms of medieval agricultural contracts runs into problems at least as early as 1086 when, it is reported, William the Conqueror "granted his land on such hard terms, the hardest he could. Then a second came and offered more than the other earlier gave, and the king let it go to the man who offered him more" (*Anglo-Saxon Chronicle* [11th–12th cents.] 1996, p. 218). Ganshof and Verhulst suggest that where sharecropping was practiced on the Continent "it seems to have been an adaptation of local

custom," but if so, it was a widespread local custom, and one would like an explanation of why it did not spread to England.

Hilton (1990, pp. 512–15) suggests that lords did not choose sharecropping contracts because they preferred rents in cash to rents in kind. But this confuses the nature of the rent (fixed or proportional, which have different incentive effects) with the currency in which the rent is denominated (coins or grain). One can have sharecropping contracts payable in cash, or rental contracts payable in kind. In fact, wage payments in kind were common (see Campbell 2000, pp. 199, 202; Dyer 1989b, p. 380; Langdon 1991, p. 438; Stacey 1986, p. 932), and so were rental payments in kind (see, for example, Bolton 1980, p. 40; Bridbury 1978, pp. 511, 517; Du Boulay 1965, pp. 448–49; Dyer 1989b, p. 312; Faith 1994, pp. 658–59; Halcrow 1955, pp. 351, 356; Hare 1981, p. 1; Harvey 1974, pp. 349–51; Harvey 1969, pp. 20–23; Lennard 1975, p. 521; Lomas 1978, pp. 343–44; Mate 1983, pp. 332, 340–41; Miller 1971, pp. 2, 8); and there is no reason why tenant farmers could not have paid a share of the value of their harvest according to prevailing prices or some other agreed-on price.

Hilton (1990, p. 517) also suggests that "the collection from peasants of a proportion of the crop was by no means easy" and that "the direct producers could by one means or another cheat the landlord of his proper share of the product"; but this story does not explain the difference between England and the Continent that promoted large-scale sharecropping in the latter and not in the former.

Having flagged this issue, I do not resolve it. I have been unable to find a convincing and testable explanation for why sharecropping was less advantageous in England than elsewhere. Sharecropping contracts could, in principle, be enforced using a writ of covenant, and in any event, if it was advantageous, one would expect that lords themselves would be willing to enforce such con-

tracts in their own manorial courts. This is a useful subject for further research.

VIII Conclusion

The basic hypothesis that legal change brought about changes in contract structure is plausible. The movement on the Continent toward more leasing from 1200 to 1500 can be explained by increasing living standards. In England, the movement toward more direct management can be explained by developments in property law that increased the security of freehold property rights while not giving comparable protection to leaseholds; and the movement back toward leasing can be explained by leasehold protection's catching up to freehold protection in the fourteenth century.

References

1. Abel, Wilhelm. 1980. *Agricultural Fluctuations in Europe: From the Thirteenth to the Twentieth Centuries*, translated by Olive Ordish. New York: St. Martin's Press.

2. Allen, Robert C. 2001. The Great Divergence in European Wages and Prices from the Middle Ages to the First World War. *Explorations in Economic History* 38:411–47.

3. Allen, Robert C. n.d. Wages, Prices & Living Standards: The World-Historical Perspective. http://www.economics.ox.ac.uk/Members/robert.allen/WagesPrices.htm (last accessed Jan. 24, 2007).

4. *The Anglo-Saxon Chronicle*, translated and edited by M.J. Swanton. [11th–12th cents.] 1996. New York: Routledge.

5. *Annales Monastici*, edited by Henry Richards Luard. 1869. London: Longmans, Green, Readers, and Dyer.

6. Arnold, Morris S. 1976. Fourteenth-Century Promises. *Cambridge Law Journal* 35:321–34.

7. Baker, J.H. 1990. *An Introduction to English Legal History.* 3d ed. London: Butterworths.

8. Barzel, Yoram. 1997. *Economic Analysis of Property Rights.* 2d ed. Cambridge: Cambridge University Press.

9. Bellomo, Manlio. 1995. *The Common Legal Past of Europe: 1000–1800*, translated by Lydia G. Cochrane. Washington: Catholic University of America Press.

10. Biancalana, Joseph. 2002. Actions of Covenant, 1200–1330. *Law and History Review* 20:1–57.

11. Binswanger, Hans P., Klaus Deininger, and Gershon Feder. 1995. Power, Distortions, Revolt and Reform in Agricultural Land Relations. Pp. 2659–2772 in vol. 3 of *Handbook of Development Economics*, edited by J. Behrman and T.N. Srinivasan. Amsterdam: North-Holland.

12. Bolton, J.L. 1980. *The Medieval English Economy 1150–1500*. London: J.M. Dent & Sons Ltd.

13. Bracton, Henry de. [c. 1230] 1997. *On the Laws and Customs of England*, edited and translated by Samuel E. Thorne. Buffalo, N.Y.: W.S. Hein.

14. *Brancaster v. Master of Royston*. [1383] 1996. Pp. 208–09 of *Year Books of Richard II: 6 Richard II, 1382–1383*, edited by Samuel E. Thorne with Michael E. Hager and Margaret MacVeagh Thorne. Cambridge, Mass.: Ames Foundation.

15. Bridbury, A.R. 1978. The Farming Out of Manors. *Economic History Review* 31 (n.s.):503–20.

16. Britnell, R.H. 1993. *The commercialisation of English society, 1000–1500*. Cambridge: Cambridge University Press.

17. Campbell, Bruce M.S. 2000. *English Seigniorial Agriculture, 1250–1450*. Cambridge: Cambridge University Press.

18. Caenegem, R.C. van. 1992. *An Historical Introduction to Private Law*, translated by D.E.L. Johnston. Cambridge: Cambridge University Press.

19. *Cartulary of Cirencester Abbey, Gloucestershire*. 1964. London: Oxford University Press.

20. Clark, Gregory. 2007. The Long March of History: Farm Wages, Population, and Economic Growth, England, 1209–1869. *Economic History Review* 60 (n.s.):97–135.

21. *Close Rolls of the Reign of Henry III.* [1911] 1970. Reprint, Nendeln/Liechtenstein: Kraus Reprint.

22. Coss, P.R. 1975. Sir Geoffrey de Langley and the Crisis of the Knightly Class in Thirteenth-Century England. *Past and Present* 68:3–37.

23. Donahue, Charles, Jr. 1996. Introduction. Pp. *17–211* of *Year Books of Richard II: 6 Richard II, 1382–1383*, edited by Samuel E. Thorne with Michael E. Hager and Margaret MacVeagh Thorne. Cambridge, Mass.: Ames Foundation.

24. Donahue, Charles, Jr. 2004. Medieval and Early Modern *Lex mercatoria*: An Attempt at the *probatio diabolica*. *Chicago Journal of International Law* 5:21–37.

25. Du Boulay, F.R.H. 1965. Who Were Farming the English Demesnes at the End of the Middle Ages? *Economic History Review*, 17 (n.s.):443–55.

26. Duby, Georges. 1962. *L'économie rurale et la vie des campagnes dans l'occident médiéval*. Paris: Flammarion.

27. Dyer, Christopher. 1989a. *Standards of Living in the Later Middle Ages: Social Change in England c. 1200–1520*. Cambridge: Cambridge University Press.

28. Dyer, Christopher. 1989b. The Consumer and the Market in the Later Middle Ages. *Economic History Review* 42(n.s.):305–27.

29. Epstein, S.R. 1994. Regional Fairs, Institutional Innovation, and Economic Growth in Late Medieval Europe. *Economic History Review* 47 (n.s.):459–82.

30. Eswaran, Mukesh, and Ashok Kotwal. 1985. A Theory of Contractual Structure in Agriculture. *American Economic Review* 75:352–67.

31. Faith, Rosamond. 1994. Demesne Resources and Labour Rent on the Manors of St. Paul's Cathedral, 1066–1222. *Economic History Review* 47 (n.s.):657–78.

32. Farmer, David L. 1988. Prices and Wages. Pp. 715–817 in vol. 2 of *The Agrarian History of England and Wales*, edited by H.E. Hallam. London: Cambridge University Press.

33. Farmer, David L. 1991. Prices and Wages, 1350–1500. Pp. 431–525 in vol. 3 of *The Agrarian History of England and Wales*, edited by Edward Miller. London: Cambridge University Press.

34. Fenoaltea, Stefano. 1975a. The Rise and Fall of a Theoretical Model: The Manorial System. *Journal of Economic History* 35:386–409.

35. Fenoaltea, Stefano. 1975b. Authority, Efficiency and Agricultural Organization in Medieval England and Beyond: A Hypothesis. *Journal of Economic History* 35:693–718.

36. Fischer, David Hackett. 1996. *The Great Wave: Price Revolutions and the Rhythm of History.* Oxford: Oxford University Press.

37. Follett, Ken. 1989. *The Pillars of the Earth.* New York: Signet.

38. Ganshof, François Louis, and Adriaan Verhulst. 1966. Medieval Agrarian Society in Its Prime: France, the Low Countries, and Western Germany.

Pp. 291–339 in vol. 1 of *The Cambridge Economic History of Europe*, edited by M.M. Postan. 2d ed. Cambridge: Cambridge University Press.

39. Genicot, Léopold. 1966. Crisis: From the Middle Ages to Modern Times. Pp. 660–741 in vol. 1 of *The Cambridge Economic History of Europe*, edited by M.M. Postan. 2d ed. Cambridge: Cambridge University Press.

40. Genicot, Léopold. 1990. *Rural Communities in the Medieval West*. Baltimore: The Johns Hopkins University Press.

41. Gouron, André. [1990] 1993. La coutume en France au Moyen Age. *Recueils de la Société Jean Bodin pour l'histoire comparative des institutions LII: la coutume/custom, Deuxième partie*, pp. 193–217, reprinted as ch. XXI of *Droit et coutume en France aux XIIe et XIIIe siècles*. Aldershot, U.K.: Variorum.

42. Halcrow, E.M. 1955. The Decline of Demesne Farming on the Estates of Durham Cathedral Priory. *Economic History Review* 7 (n.s.):345–56.

43. Hare, J.N. 1981. The Demesne Lessees of Fifteenth-Century Wiltshire. *Agricultural History Review* 29:1–15.

44. Harvey, Barbara. 1969. The Leasing of the Abbot of Westminster's Demesnes in the Later Middle Ages. *Economic History Review* 22 (n.s.):17–27.

45. Harvey, Barbara. 1977. *Westminster Abbey and Its Estates in the Middle Ages*. Oxford: Clarendon Press.

46. Harvey, Sally. 1988. Domesday England. Pp. 45 ff. in vol. 2 of *The Agrarian History of England and Wales*, edited by H.E. Hallam. London: Cambridge University Press.

47. Hilton, R.H. 1966. *A Medieval Society: The West Midlands at the End of the Thirteenth Century.* New York: Humanities Press.

48. Hilton, Rodney. 1990. Why Was There So Little Champart Rent in Medieval England? *Journal of Peasant Studies* 17:509–19.

49. Holdsworth, Sir William. [1942] 1966. *A History of English Law.* 5th ed. London: Methuen & Co. Ltd.

50. Homans, George Caspar. 1960. *English Villagers of the Thirteenth Century.* New York: Russell & Russell.

51. Hudson, J. 1994. Anglo-Norman Land Law and the Origins of Property. Pp. 198–222 in *Law and Government in Mediaeval England and Normandy: Essays in Honour of Sir James Holt*, edited by George Garnett and John Hudson. Cambridge: Cambridge University Press.

52. Ibbetson, David J. 1986. Words and Deeds: The Action of Covenant in the Reign of Edward I. *Law and History Review* 4:71–94.

53. Jones, S.R.H. 1993. Transaction Costs, Institutional Change, and the Emergence of a Market Economy in Later Anglo-Saxon England. *Economic History Review* 46 (n.s.):658–78.

54. Kaplow, Louis, and Steven Shavell. 2002. Economic Analysis of Law. Pp. 1661–1784 in vol. 3 of *Handbook of Public Economics*, edited by Alan J. Auerbach and Martin Feldstein. Amsterdam: Elsevier.

55. Koepke, Nikola, and Joerg Baten. 2005. The Biological Standard of Living in Europe During the Last Two Millennia. *European Review of Economic History* 9:61–95.

56. Langdon, John. 1991. Water-Mills and Windmills in the West Midlands. *Economic History Review* 44 (n.s.):424–44.

57. Lennard, Reginald. 1956. The Demesnes of Glastonbury Abbey in the Eleventh and Twelfth Centuries. *Economic History Review* 8 (n.s.):355–63.

58. Lennard, R.V. 1975. The Glastonbury Estates: A Rejoinder. *Economic History Review* 28 (n.s.):517–23.

59. *Les revenus de la terre, complant, champart, métayage en Europe occidentale (IX*^{e}*–XVIII*^{e} *siècles).* 1987. Auch: Comité départemental du tourisme du Gers.

60. Lomas, R.A. 1978. The Priory of Durham and Its Demesnes in the Fourteenth and Fifteenth Centuries. *Economic History Review* 31 (n.s.):339–53.

61. Lot, Ferdinand, and Robert Fawtier. 1958. *Histoire des institutions françaises au Moyen Age.* Paris: Presses universitaires de France.

62. Malanima, Paolo. 2004. Labour, Productivity, Wages in Italy, 1270–1913. Conference paper. Towards a Global Study of Prices and Wages, Utrecht, Aug. 19–21.

63. Mate, Mavis. 1983. The Farming Out of Manors: A New Look at the Evidence from Canterbury Cathedral Priory. *Journal of Medieval History* 9:331–43.

64. McGovern, William M. 1976. The Historical Conception of a Lease for Years. *UCLA Law Review* 23:501–28.

65. Miller, Edward. 1971. England in the Twelfth and Thirteenth Centuries: An Economic Contrast? *Economic History Review* 24 (n.s.):1–14.

66. Miller, Edward. 1975. War, Taxation and the English Economy in the Late Thirteenth and Early Fourteenth Centuries. Pp. 11–31 in *War and*

Economic Development, edited by J.M. Winter. Cambridge: Cambridge University Press.

67. Nicholas, Barry. 1962. *An Introduction to Roman Law.* Oxford: Clarendon Press.

68. North, Douglass C., and Robert Paul Thomas. 1971. The Rise and Fall of the Manorial System: A Theoretical Model. *Economic History Review* 31 (n.s.):777–803.

69. Otsuka, Keijiro, Hiroyuki Chuma, and Yujiro Hayami. 1992. Land and Labor Contracts in Agrarian Economies: Theories and Facts. *Journal of Economic Literature* 30:1965–2018.

70. Palmer, Robert C. 1985. The Economic and Cultural Impact of the Origins of Property: 1180–1220. *Law and History Review* 3:375–96.

71. Penman, Sharon Kay. 2002. *Time and Chance.* New York: Putnam's.

72. Penn, Simon A.C., and Christopher Dyer. 1990. Wages and Earnings in Late Medieval England: Evidence from the Enforcement of the Labour Laws. *Economic History Review* 43 (n.s.):356–76.

73. Postan, M. 1937. The Chronology of Labour Services. *Transactions of the Royal Historical Society* 20 (4th ser.):169–93.

74. Postan, M.M. 1953. Glastonbury Estates in the Twelfth Century. *Economic History Review* 5 (n.s.):358–67.

75. Postan, M.M. 1956. Glastonbury Estates in the Twelfth Century: A Reply. *Economic History Review* 9 (n.s.):106–18.

76. Postan, M.M. 1978. A Note on the Farming Out of Manors. *Economic History Review* 31 (n.s.):521–25.

77. Poynder, N.J.T. 2003. The Growth and Decline of Direct Demesne Management. Unpublished thesis. The Queen's University of Belfast.

78. Reed, Clyde G., and Terry L. Anderson. 1973. An Economic Explanation of English Agricultural Organization in the Twelfth and Thirteenth Centuries. *Economic History Review* 26 (n.s.):134–37.

79. Shakespeare, William. [1595]. *Richard II.*

80. Stacey, Robert C. 1986. Agricultural Investment and the Management of the Royal Demesne Manors, 1236–1240. *Journal of Economic History* 46:919–34.

Notes

[1]Barzel argues that losses associated with policing a factor of production rise as the cost of that factor of production rises. Thus, "when market wage rises relative to land rent, the contract form will shift away from wage contract, which induces a (relatively) careless use of labour, to the land-rent contract . . . which induces a (relatively) careless use of land" (Barzel 1997, p. 49). Poynder accepts this "price scissors" explanation (2003, chh. 3.2, 5.1, 5.2). This is correct in many cases, but not all (see Equations (7)–(9) below, showing that the effect of output price on leasing is ambiguous), and in general it is imprecise and potentially misleading. As I argue below, merely talking of wages and rents varying with respect to each other is unhelpful, since wages and rents are jointly determined by the fundamental parameters of the system; an explanation focused on changing wages and rents must explain what varying parameters caused those changes. Thus, as I show below in Proposition 2, increases in wages are associated with increases in leasing, but it is because an increase in the outside option $\bar{u}$ simultaneously causes w to rise and r to fall, and if the disutility of effort is not too high, the fall in r is less than the rise in w.

Appendices

A Proof of Lemma 1

Proof. The peasant, when already faced with a leasing contract with a given r, chooses e by comparing $Ev(pq_L\theta - r) - e_L$ to $Ev(pq_H\theta - r) - e_H$ — in other words, by inspecting the sign of $\delta(e_H) \equiv Ev(pq_H\theta - r) - e_H - Ev(pq_L\theta - r) + e_L \equiv Ev(pq_H\theta - r) - Ev(pq_L\theta - r) - (e_H - e_L)$ (the relative advantage of high effort). It is clear that, given r:

$$\delta(e_L) = Ev(pq_H\theta - r) - Ev(pq_L\theta - r) > 0, \tag{A1}$$

$$\delta'(e_H) = -1, \text{ and} \tag{A2}$$

$$\lim_{e_H \to \infty} \delta(e_H) = -\infty. \tag{A3}$$

(Equation (A1) is true because $q_H > q_L$, $\theta > 0$, and v is increasing, so that $v(pq_H\theta - r)$ first-order stochastically dominates $v(pq_L\theta - r)$.) Therefore, there is a unique $\bar{e} > e_L$ such that $\delta(e_H) > 0$ for $e_H < \bar{e}$ and $\delta(e_H) < 0$ for $e_H > \bar{e}$. ■

B Proof of Lemma 2

Proof. By the nature of the threshold $\bar{e}$, we have:

$$Ev(pq_H\theta - r) - \bar{e} \equiv Ev(pq_L\theta - r) - e_L. \tag{B1}$$

Differentiating with respect to r:

$$\frac{\partial \bar{e}}{\partial r} = Ev'(pq_L\theta - r) - Ev'(pq_H\theta - r) > 0. \tag{B2}$$

(Equation (B2) is true because $q_H > q_L$ and $\theta > 0$, and v' is decreasing, so that $v'(pq_L\theta - r)$ first-order stochastically dominates $v'(pq_H\theta - r)$.) Thus, as the rental payment rises, so does the threshold required high-effort level at which the peasant decides it is no longer worthwhile to work hard. ■

C Proof of Proposition 2

Proof. Consider the proportion of leasing:

$$\Psi = \Phi\left(\frac{r + v^{-1}(\bar{u} + e_L)}{p}\right), \tag{C1}$$

where r is determined by:

$$Ev(pq_H\theta - r) - e_H = \bar{u}. \tag{C2}$$

(1) Differentiating Ψ with respect to $\bar{u}$ (and dropping the argument of Φ' for convenience):

$$\frac{\partial \Psi}{\partial \bar{u}} = \frac{\Phi'}{p} \cdot \left[\frac{\partial r}{\partial \bar{u}} + (v^{-1})'(\bar{u} + e_L)\right]. \tag{C3}$$

(2) We obtain $\frac{\partial r}{\partial \bar{u}}$ by implicitly differentiating equation (C2):

$$-\frac{\partial r}{\partial \bar{u}} Ev'(pq_H\theta - r) = 1 \Longrightarrow \frac{\partial r}{\partial \bar{u}} = \frac{-1}{Ev'(pq_H\theta - r)}. \tag{C4}$$

(3) Substituting the result of (C4) into equation (C3), and using the fact that $(v^{-1})'(y) = \frac{1}{v'(v^{-1}(y))}$:

$$\begin{aligned} \frac{\partial \Psi}{\partial \bar{u}} &= \frac{\Phi'}{p} \cdot \left[\frac{1}{v'(v^{-1}(\bar{u} + e_L))} - \frac{1}{Ev'(pq_H\theta - r)}\right] \\ &= \frac{\Phi'}{p} \cdot \frac{Ev'(pq_H\theta - r) - v'(v^{-1}(\bar{u} + e_L))}{v'(v^{-1}(\bar{u}) + e_L) Ev'(pq_H\theta - r)}. \end{aligned} \tag{C5}$$

The sign of $\frac{\partial \Psi}{\partial \bar{u}}$ is the same as the sign of:

$$\Gamma \equiv Ev'(pq_H\theta - r) - v'(v^{-1}(\bar{u} + e_L)). \tag{C6}$$

(4) Now we establish that v^{-1} and v' are convex. First, since v' is decreasing and v^{-1} is increasing, $(v^{-1})' = \frac{1}{v'(v^{-1})}$ is increasing; thus, $(v^{-1})'' > 0$ and so v^{-1} is convex. Next, since v has constant relative risk aversion, $-\frac{yv''(y)}{v'(y)} = C$ for all y. Differentiating (and dropping the y arguments for convenience):

$$\begin{aligned} \frac{(yv''' + v'')v' - y(v'')^2}{(v')^2} = 0 &\Longrightarrow (yv''' + v'')v' = y(v'')^2 \\ &\Longrightarrow v''' = \frac{1}{y}\left[\frac{y(v'')^2}{v'} - v''\right] > 0, \end{aligned} \tag{C7}$$

since $v' > 0$ and $v'' < 0$. Thus, v' is convex. Combining equation (C2) with the convexity of v^{-1} and v' yields:

$$\begin{aligned} Ev(pq_H\theta - r) - e_H = \bar{u} \Rightarrow v'(v^{-1}(Ev(pq_H\theta - r))) &= v'(v^{-1}(\bar{u} + e_H)) \\ \Longrightarrow Ev'(pq_H\theta - r) &> v'(v^{-1}(\bar{u} + e_H)). \end{aligned} \tag{C8}$$

(5) Now suppose $e_H = e_L = e$. Then, substituting this and the result of (C8) into equation (C6):

$$\Gamma = Ev'(pq_H\theta - r) - v'(v^{-1}(\bar{u} + e)) > 0 \Rightarrow \frac{\partial \Psi}{\partial \bar{u}} > 0. \tag{C9}$$

Because $\frac{\partial \Psi}{\partial \bar{u}}$ is continuous, $\frac{\partial \Psi}{\partial \bar{u}}$ is also negative as e_H rises in some range above e_L. (We have already ruled out the case where e_H is too large as economically uninteresting, because high effort is no longer worthwhile then.)

(6) Thus, for any $\bar{u}$, there exists a maximum disutility of effort $\hat{e}(\bar{u})$ such that $\frac{\partial \Psi}{\partial \bar{u}} > 0$ for all $e_H \in (0, \hat{e}(\bar{u}))$. So if the disutility of effort is not too high,

increasing living standards make leasing more common. ■

D Proof of Proposition 3

Proof. Consider the proportion of leasing:

$$\Psi_1 \equiv \Phi\left(\frac{r + v^{-1}(\frac{\bar{u}+e_L-(1-\pi_F)u_0}{\pi_F})}{p}\right), \tag{D1}$$

where r is determined by

$$\pi_F Ev(pq_H\theta - r) + (1-\pi_F)u_0 - e_H = \bar{u}. \tag{D2}$$

(1) Differentiating Ψ_1 with respect to π_F (and dropping the argument of Φ' for convenience):

$$\frac{\partial \Psi_1}{\partial \pi_F} = \frac{\Phi'}{p} \cdot \left[\frac{\partial r}{\partial \pi_F} - \frac{\bar{u}+e_L-u_0}{\pi_F^2}(v^{-1})'\left(\frac{\bar{u}+e_L-(1-\pi_F)u_0}{\pi_F}\right)\right]. \tag{D3}$$

(2) We obtain $\frac{\partial r}{\partial p_F}$ by implicitly differentiating equation (D2):

$$\begin{aligned} & Ev(pq_H\theta - r) - \pi_F Ev'(pq_H\theta - r)\frac{\partial r}{\partial \pi_F} - u_0 = 0 \\ \Longrightarrow \quad & \frac{\partial r}{\partial \pi_F} = \frac{Ev(pq_H\theta - r) - u_0}{\pi_F Ev'(pq_H\theta - r)} = \frac{\bar{u}+e_H-u_0}{\pi_F^2 Ev'(pq_H\theta - r)}. \end{aligned} \tag{D4}$$

(3) Substituting the result of (D4) into equation (D3) and using the fact that $(v^{-1})' = \frac{1}{v'(v^{-1})}$:

$$\begin{aligned} \frac{\partial \Psi_1}{\partial \pi_F} &= \frac{\Phi'}{p\pi_F^2} \cdot \left[\frac{\bar{u}+e_H-u_0}{Ev'(pq_H\theta - r)} - \frac{\bar{u}+e_L-u_0}{v'(v^{-1}(\frac{\bar{u}+e_L-(1-\pi_F)u_0}{\pi_F}))}\right] \\ &= \frac{\Phi'}{p\pi_F^2} \cdot \frac{\Gamma_1}{v'(v^{-1}(\frac{\bar{u}+e_L-(1-\pi_F)u_0}{\pi_F}))Ev'(pq_H\theta - r)}, \end{aligned} \tag{D5}$$

where

$$\Gamma_1 \equiv (\bar{u} + e_H - u_0)v'(v^{-1}(\frac{\bar{u} + e_L - (1-\pi_F)u_0}{\pi_F})) - (\bar{u} + e_L - u_0)Ev'(pq_H\theta - r) \tag{D6}$$

has the same sign as $\frac{\partial \Psi_1}{\partial \pi_F}$.

(4) Combining equation (D2) with the convexity of v^{-1} and v' (see the proof of Proposition 2):

$$\begin{aligned}
&\pi_F Ev(pq_H\theta - r) + (1-\pi_F)u_0 - e_H = \bar{u} \\
&\Rightarrow Ev(pq_H\theta - r) = \frac{\bar{u} + e_H - (1-\pi_F)u_0}{\pi_F} \\
&\Rightarrow v'(v^{-1}(Ev(pq_H\theta - r))) = v'\left(v^{-1}\left(\frac{\bar{u} + e_H - (1-\pi_F)u_0}{\pi_F}\right)\right) \\
&\Rightarrow Ev'(pq_H\theta - r) > v'\left(v^{-1}\left(\frac{\bar{u} + e_H - (1-\pi_F)u_0}{\pi_F}\right)\right).
\end{aligned} \tag{D7}$$

(5) Now suppose $e_H = e_L = e$. Then, substituting this and the result of (D7) into equation (D6):

$$\Gamma_1 = (\bar{u}+e-u_0)\left[v'\left(v^{-1}\left(\frac{\bar{u} + e - (1-\pi_F)u_0}{\pi_F}\right)\right) - Ev'(pq_H\theta - r)\right] < 0 \Rightarrow \frac{\partial \Psi_1}{\partial \pi_F} < 0, \tag{D8}$$

as long as $u_0 < \bar{u} + e$ (that is, provided the peasant's dispossession utility is low enough) and as long as $\pi_F > 0$. Because $\frac{\partial \Psi_1}{\partial \pi_F}$ is continuous, $\frac{\partial \Psi_1}{\partial \pi_F}$ is also negative as e_H rises in some range above e_L and as long as $u_0 < \bar{u} + e_L$. (We have already ruled out the case where e_H is too large as economically uninteresting, because high effort is no longer worthwhile then.)

(6) Thus, for any $\pi_F > 0$, and provided $u_0 < \bar{u} + e_L$, there exists a maximum disutility of effort $\hat{e}(\pi_F)$ such that $\frac{\partial \Psi_1}{\partial \pi_F} < 0$ for all $e_H \in (e_L, \hat{e}(\pi_F))$. So if the disutility of effort is not too high, increasing security of freehold tenure increases direct management. ■

E Proof of Proposition 4

Proof. Consider the proportion of leasing:

$$\Psi_2 \equiv \Phi\left(\frac{r + v^{-1}(\bar{u} + e_L)}{p}\right), \tag{E1}$$

where r is determined by:

$$\pi_L E v(pq_H\theta - r) + (1 - \pi_L)u_0 - e_H = \bar{u}. \tag{E2}$$

(1) Differentiating Ψ_2 with respect to π_L (and dropping the argument of Φ' for convenience):

$$\frac{\partial \Psi_2}{\partial \pi_L} = \frac{\Phi'}{p} \cdot \frac{\partial r}{\partial \pi_L}. \tag{E3}$$

(2) We obtain $\frac{\partial r}{\partial \pi_L}$ by implicitly differentiating equation (E2):

$$\begin{aligned} & Ev(pq_H\theta - r) - \pi_L E v'(pq_H\theta - r)\frac{\partial r}{\partial \pi_L} - u_0 = 0 \\ \Longrightarrow & \frac{\partial r}{\partial \pi_L} = \frac{Ev(pq_H\theta - r) - u_0}{\pi_L E v'(pq_H\theta - r)} = \frac{\bar{u} + e_H - u_0}{\pi_L^2 E v'(pq_H\theta - r)}. \end{aligned} \tag{E4}$$

(3) So $\frac{\partial \Psi_2}{\partial \pi_L}$ has the same sign as $\bar{u} + e_H - u_0$. This is positive as long as the peasant's dispossession utility, u_0, is lower than the utility he would have enjoyed from his income under a secure lease, $\bar{u} + e_H$. So for $u_0 < \bar{u} + e_H$, $\frac{\partial \Psi_2}{\partial \pi_L} > 0$, that is, increasing security of leasehold tenure increases leasing. ■

Tables

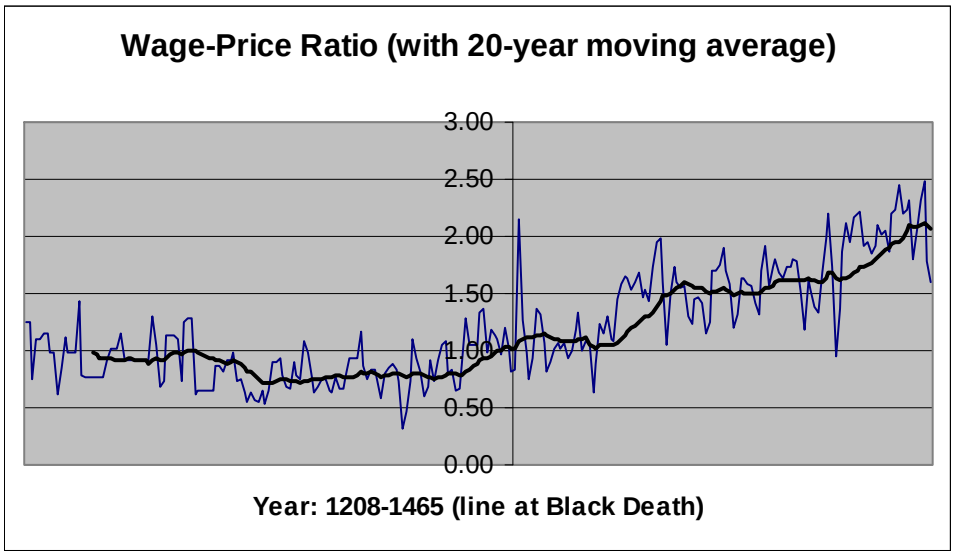
1 Chronology of direct management in England

Estate type	**Estate**	1060 –1119	1120 –1179	1180 –1239	1240 –1299	1300 –1359	1360 –1419	1420 –1479	1480 –1539
Lay	The crown	F	F	F/S	F/S	F	F	F	F
	Berkeley						M/F		
	Cornwall				S	M/S			
	De Clare			S/M		M/S	M/F		
	De Curci		F	S					
	Gaunt						M/F		
	Haughley			F/M					
	Percy					S	S/F		
Bishopric	Canterbury	F		F/M	M	M	M/F		
	Durham	F					F		
	Ely	F	F		M				
	Lincoln		F	S					
	Winchester		F	M	M	M	M/S	S/F	
	Worcester	F			M		S/F	F	
Abbey	Battle			F	M	M	S/M	S/F	
	Beaulieu				M				F
	Bec				M	M/S	S/F		
	Bury	F		F/M	M	M	M/S	S	F
	Crowland				M	M/S		S/F	
	Fountains				M	S			S
	Glastonbury	F	F/S		M	M	S	S	S/F
	Haughmond					M		S/F	
	Hyde		F	S					
	Leicester			S	M	M		F	
	Malmesbury		F	S					
	Meaux				M		S		
	Peterborough	F	F	S	M	M	M	F	F
	Ramsey	F	F	S	M	M	M/F	F	F
	St. Benet of Holme	F			M				
	Selby					S/F	F		
	Sherbourne			S/M					
	Tavistock								S/F
	Westminster			F	M	M	S	F	F
Priory	Bolton				M	M		F	
	Canterbury	F	F	M	M	M	M/F	F	F
	Durham				S	S	S/F	F	
	Ely	F	F		M	M	M	S	F
	Norwich				M	M	M/F	F	F
	Winchester					M	S	F	
	Worcester	F				M	M	S	F
College	Merton College					S	F		
	New College						S/F		

Source: Poynder (2003, ch. 1, tbl. 1.1). This is a qualitative assessment of demesne management on 42 estates (an estate contains several demesnes). The extent of direct demesne management in any period is placed in three classes: "none or few" substantial demesnes managed directly (F), "a substantial proportion" so managed (S), and "mostly or all" so managed (M). If within a single period the extent of direct management is recognized to have changed, two classes are separated by a slash. Only estates with two or more assessments of class have been included.

Figures

1 Real agricultural wages in England, 1208–1465



Wages from 1208–09 to 1355–56 were calculated by averaging the agricultural wages (threshing & winnowing, reaping & binding) from Farmer (1988, p. 811 tbl. F). Wages from 1350–51 to 1465–66 were taken from the agricultural wages column (mean of threshing & winnowing, reaping & binding, and mowing & spreading) from Farmer (1991, p. 520 apx. I). For the overlap period, 1350–51 to 1355–56, the later wage series was rescaled so the means from the overlap period matched the means from the overlap period in the first series (since the series are indexed by different base periods); then, the values in both series were averaged for the overlap period.

Prices from 1208–09 to 1355–56 were taken from Farmer (1988, p. 776 tbl. 7.10). "The price index . . . assumes the consumption by a family of four quarters of barley (for bread and malt) and two quarters of peas, the tenth part of an ox, half a sheep, half a pig, a quarter of a wey of cheese, a tenth of a quarter of salt, and a stone of wool, a very modest annual allowance for a family of four or five" (p. 775). Prices from 1350–51 to 1465–66 were taken from Farmer (1991, p. 520 apx. I). The bundle used in this later series is the same as the bundle used in the earlier series (p. 492 n. 115). For the overlap period, 1350–51 to 1355–56, the later series was rescaled so the means from the overlap period matched the means from the overlap period in the earlier series (since the series are indexed by different base periods); then, the values in both series were averaged for the overlap period.