
5 Original assignment of private property

Boudewijn Bouckaert

1. Introduction

Property rights' systems, traditional as well as modern complex ones, have to cope with the problem of the assignment of non-owned, abandoned, lost or newly discovered goods. The origins of the assignment-problem are thus obvious: (1) either already known assets are not yet appropriated by members of the concerned community or are abandoned again by these members; (2) new types of scarce resources, not known or not regarded as scarce at the moment of the elaboration of the rules of the property system, may appear. Examples of (1) are: newly discovered acquired or conquered land such as the American West, wild animals, and water from seas, oceans and streams. Examples of (2) are: inventions and artistic creations, frequencies of the broadcast spectrum, subsurface minerals, and orbital spaces. The question arises by which rules or procedures goods without owner should be assigned and be put, provided transferability of such assets is allowed, within market circulation.

The choice of the rule of original assignment would not matter from an efficiency point of view when transaction costs are zero. Whomever the good is originally assigned to, the market would relocate it without friction to the most efficient user. As transaction costs may be prohibitively high for efficient relocation, it is possible that inefficiencies in the original assignment remain uncorrected through the market. This general remark, based on the Coase-theorem, applies also to the wider notion of political transaction costs. Libecap remarks that original assignment rules, once decided politically and made operational on the field, are often difficult to change as many constituencies develop a stake in the status quo and the distributional implications of any change in it can be both large and uncertain (Libecap, 2006).

In order to define the subject matter of this chapter more clearly we distinguish it from two other topics in the economic analysis of property law: the emergence of property systems as such and adverse possession.

The problem of emergence of property systems regards the economic rationale and the involved cost categories of setting up a property system and institutions as such. Under the heading of emergence of property rights the evolutionary process leading from an open access-situation without rules nor institutions towards an ordered system of rights and administrative,

policing and adjudicative institutions is analyzed. In this chapter, however, a problem is discussed which necessarily emerges also within already established property systems. Most often the problem of the emergence of a property system also involves aspects of public choice and constitutional economics. In this chapter these aspects are not systematically but only occasionally discussed. Occasionally, when public choice aspects provide us with some explanation of the choice of an original assignment rule.

The problem of initial acquisition should also be distinguished from the problem of adverse possession. In the former case, assets non-owned in the terms of the concerned legal systems (for example lands of the American West in terms of the US legal system, not necessarily in terms of Native American tribal systems), are involved. In the latter case, assets are concerned which are, though still owned, not in actual possession of the owner but of another person, that is, the adverse possessor. The problem of adverse possession regards both the relationship of the adverse possessor with third parties and the real owner (see Chapter 8 in this volume). In both cases, however, the problem of the definition of possession arises. In the first case because first possession constitutes often the legal base of initial acquisition. In the second case, in order to determine who is entitled to claim the protection, the possessor enjoys against third parties, and to determine the start of prescription periods.

2. First appropriation, auction or contracts?

The rule of first appropriation ('first come, first served'; 'finders keepers') is firmly rooted in Western legal culture and social practice. Also in state of nature situations, such as the allocation of parking places on the street (Epstein, 2002) and seats in a restaurant, people spontaneously respect the position of the first occupant. Probably the possessive advantage, due to the fact that drive out-costs are on average higher than defence-costs, explains a lot of this spontaneous attitude.

Legal rules, endorsing first appropriation, are often considered as expressions of a democratic and egalitarian spirit. Everyone has an equal chance at the start, without regard to his class-status, race or religion. The *American Homestead Act* of 1862 is probably one of the most striking examples of this egalitarian philosophy (Allen, 1991; Lueck, 1995). The act allowed families to claim 160 acres of land, a surface considered as sufficient to feed a large farmer's family. At the payment of around 10 dollars and the uninterrupted occupation of the claimed land during five years, the claimants obtained a valid title. The Act was applicable to the vast federal territories, west of the Mississippi-Missouri. About 250,000,000 acres were patented under the Act.

Under *Roman law*, first appropriation (*occupatio*) was possible for goods

not belonging to anybody (*quae antea nullius erant*), such as wild animals, for goods taken from enemies (*quae ex hostibus capiuntur*), for abandoned goods (*res derelictae*) (see Gaius 2, 66; see D. 41,1,1,1–7; D. 41,7,1. Van Oven, 1948). For *treasure trove* (*thesaurus*) finders keepers applied when the treasure was found in the finders land. When another found the treasure half of the treasure accrued to the finder, half to the owner (see I, 2, 1, 39). Van Oven 1948; see also art. 716 Belgian and French C.C.).

The *Common law* upholds also a rule of first appropriation concerning non-owned things such as wild animals, as is illustrated by the famous case of *Pierson v. Post* (3 Cai. R., 175, N.Y. Supreme Court, 1805 – see further). First appropriation is also deeply rooted in *liberal legal philosophy*. According to John Locke first appropriation through mixing labour with the land constituted the only way of initial acquisition in the state of nature. As Western colonists considered Native Americans as still living under a state of nature, Lockean philosophy provided them with an argument to homestead freely land in America (Grunebaum, 1987; Tully, 1994). While the first appropriation rule is firmly rooted in our legal tradition and social practices, many economic studies criticize this solution as an inefficient rule (Anderson and Hill, 1990; Barzel, 1968; Libecap and Wiggins, 1984; Merrill, 1986).

Before discussing the economic merits or shortcomings of the first appropriation rule, we have to make an important distinction between the possession of a *resource stock* and the possession of *resource flows* (Lueck, 1995). In the first case the possessor, able to control the stock in a stable way has the prospect to future flows of this stock. In the second case, the possessor, unable to control the stock as such, is only able to capture flows once they are generated by the stock.

Examples of the two categories are:

Table 5.1 *Stock–flow distinction*

| <i>Resource Stock</i> | <i>Resource Flow</i> |
|-----------------------|----------------------|
| – fields | crops |
| – cattle | meat, milk |
| – real estate | rents |
| – copyright | royalties |
| – money | interests |
| – ocean | fisheries |
| – streams, rivers | water |
| – aquifer | water |
| – woods | wild game |
| – oil wells | oil |

The discussion about the efficiency of initial acquisition rules has another dimension in cases of stock possession than in cases allowing only flow capture. Consequently the case of stock possession is discussed first.

Several economic analyses point out that first appropriation rules concerning resource stock provoke a race among potential claimants, by which ownership is established *too early*. This may lead to *a full dissipation of the rental stream of the asset*. In order to show this source of inefficiency, a comparison is made with the situation in which only *a single claimant* is interested in establishing ownership of a stock resource. It is assumed also that the flow value *grows over time*, due to increases in the demand for the asset caused, for instance, by population growth (Lueck, 1995, 398).

Under these assumptions the optimal time t_x to establish ownership for a single claimant is the point where the marginal return from waiting equals the marginal cost of waiting. The return from waiting consists of the returns of alternative activities, the single claimant can pursue by desisting temporarily from establishing stock possession. These returns are declining over time. The costs of waiting consist of the value of the stock flows missed during the waiting and as it was assumed that these flow values grow over time, marginal costs of waiting are increasing.

When a first appropriation rule opens an *unconstrained competition among many potential claimants* and these claimants are more or less homogeneous (more or less at an equal starting point in the race due to equality of physical strength, investments and information), rents will be entirely dissipated.

In case of a competitive rush between potential claimants to claim rights a claim is worth staking as long as the net value of the asset is positive. As a consequence the ownership will be established at t_R , when the present value of the rental flow equals the present value of the entire costs of establishing ownership at t_R . Rights are, compared with the single-claimant situation, established too early. The race equilibrium implies that the rental stream is fully dissipated. In addition, unconstrained competitive races involve also the costs of the not awarded claimants. Their efforts in the race are pointless *ex post*.

Homogeneity among potential claimants is, however, very unlikely. Several factors in the real world cause heterogeneity among claimants by which a full dissipation of rental streams of resource stock does not occur. Heterogeneity in this context does not refer to the variance of distribution of the costs of establishing ownership among potential claimants, but to the cost gaps between the lowest cost-contenders.

The distribution of costs in Figure 5.1b is at greater variance than in Figure 5.1a, yet heterogeneity, as understood in this context, is higher in the distribution of costs in Figure 5.1a because the differences between the

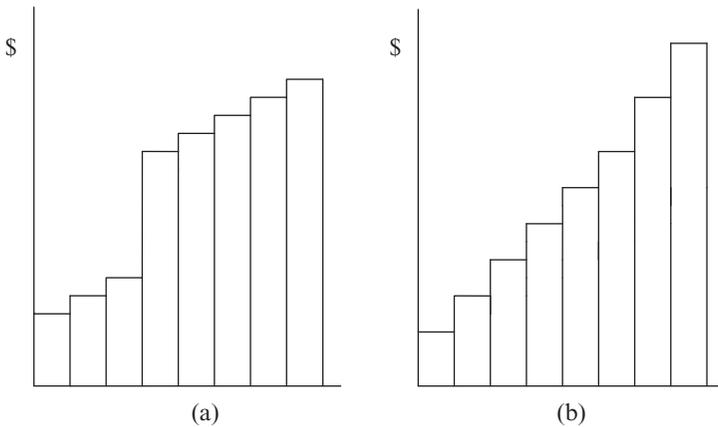


Figure 5.1 Relevant cost-heterogeneity among race-contenders

lowest cost-contenders, the ones most likely to participate to the race, and the higher cost-contenders, are larger.

In the case of relevant heterogeneity the lowest cost-contender may enjoy such an advantage to the next best contender that his appropriative behaviour becomes similar to that of a single claimant, by which appropriation at an efficient time may occur. Heterogeneity of potential claimants can be the result of different factors such as unequal distribution of talents and information, an historical advantage in investment, or random factors. It can be diminished by investments, for instance a company investing in research capacity in order to fill the gap with a competitor who had started already his rush to a patentable invention. The other factors are, however, important enough to preserve in most cases a decisive margin of heterogeneity.

Beside natural factors such as uneven distribution of talents and random factors, heterogeneity can also be preserved by an institutional factor. Possession can be defined in such way that competitive races are excluded. The finders keepers rule, for instance, attaches crucial legal importance to the random fact of finding, so that competitive rushes become impossible.

As a consequence, one must conclude that a first appropriation rule does not lead necessarily to full dissipation of rents. When heterogeneity among potential claimants is guaranteed, dissipation will be avoided and property rights will be established on the efficient point in time.

Auction is the most prominent alternative for a first appropriation rule. This procedure presupposes a pre-appropriation by a third party, such as

public authorities, pretending to have a general claim on assets, especially land, on the basis of legal prerogatives such as eminent domain, or the right to the spoils of conquest or discovery. These pre-appropriated assets are then submitted to an auction procedure, through which the asset is allotted to the highest bidder. By this procedure, it is argued, assets are on average allotted to the most efficient users. The users expecting the highest return of the asset will consequently bid away with the highest offers. This market mimicking procedure implies, however, also some costs. Lueck considers three cost-categories (Lueck, 1995, 403):

(1) *Defining the auctioned assets*: an auction requires a definition of the auctioned assets; such a definition requires costly information (search costs, prospecting, and valuation) about the assets in order to avoid the so-called winners' curse. Bidders underestimating systematically the risks involved with the possession and exploitation of the asset, may win the auction. The bad bidders drive out the good bidders (Hansen and Thomas, 1999). Such costs can be prohibitively high, so that an auction procedure has to be written off for initial acquisition. An extreme example in this respect regards inventions. In order to auction them, the auctioneer has to invent them first, in order to define them. A first to invent policy, which allots the intellectual property to the inventor himself, is obviously much cheaper because it avoids the transaction costs between inventor and auctioneer, and auctioneer and bidders.

(2) *Costs of the auction*: auctions are costly, not only on the side of the auctioneer, but also on the side of potential bidders.

(3) *Costs of protection of property rights*: in order to auction, the auctioneer has to secure property rights on the auctioned assets.

According to Lueck a trade-off exists in the choice between the two main alternatives, that is, first appropriation or auction, between two categories of costs: the efficiency losses due to too early establishment of property rights in competitive races on one hand, and the different costs of auction procedures on the other hand. In particular two factors are decisive in this respect: the heterogeneity-homogeneity of potential claimants for the cost levels of first appropriation; and the possibilities to define and to evaluate *ex ante* the concerned assets for cost levels of auction (Lueck, 1995, 403).

Anderson and Hill perceive a third method of original assignment of property rights (Anderson and Hill, 2002). Races and auction are both the outcome of top-down procedures as they are exclusively driven by political processes. Anderson and Hill distinguish a bottom-up entrepreneurial alternative in which property rights are established by contracts.

This is possible either by specific or by general contracting. In case of specific contracting, i.e. between individuals, groups or corporations, the property establishing contract involves two aspects: a) a contract of the original holder with a new holder transferring the asset; b) a contract of the original and new holder and with all involved third parties in which the latter promise to respect the property right of the new holder. By general contracting the second aspect is embedded in a general law binding all members of a polity.

The establishment of property rights through contracting is driven by entrepreneurs, perceiving opportunities in a rearrangement or redefinition of property rights, allowing them to capture Ricardian rents from the scarcity of resources which cannot be replicated. The property rights' entrepreneur is alert to Ricardian rents, not perceived by others but derived from better-defined and better-enforced property rights.

The establishment of property rights on the Western frontier in the United States during the nineteenth century is the theatre par excellence of the contractual way. The customary range rights evolved from the simple priority principle and the claiming of land in an inexpensive way (e.g. by notification in newspapers) to refined systems of specific contracting. Cattlemen associations organized in the West a network of contracts aiming at preserving individual ownership on herds, affording protection of the herds, and controlling the grazing of the open range in order to avoid overcrowding. Roundup districts acted as exclusion systems towards interlopers. The system of specific contracts was gradually supplanted by the Washington-driven homestead laws. According to Anderson and Hill this law proved to be largely inefficient when applied to the big plains of the Midwest. The homesteading destroyed specific contracting networks, based on practical experience. The landholding units in the homestead laws were inappropriate because they were too small for more arid areas. This led to disasters such as the dust bowl in Oklahoma during the 1930s. Homesteading laws encouraged racing, thereby stimulating homogeneity of the participants. Settlements were premature and inappropriate investments were stimulated (Anderson and Hill, 2002). The belief in the sustainability of agriculture in arid zones on too small plots was stimulated by false folk wisdom such as the myth of 'rain follows the plow' or dry-farming-doctrine (Libecap and Hansen, 2001). The most dramatic episode of imposition of inefficient homesteading laws concerns the race on the Cherokee outlet, destroying an elaborated network of specific contracting, set up by the Cherokee Livestock Association (Anderson and Hill (2002), Lefebvre, 1992; Newsom, 1992). Anderson and Hill explain the inefficiency of the homestead laws by the lack of a residual claimant in the lawmaking process. This in contrast with the process of

specific contracting, in which all involved parties were residual claimants (Anderson and Hill, 2002, 512).

3. Rules of capture

When the establishment of property rights on an entire stock is too costly, because exclusion costs are prohibitively high, property rights will only prevail on the flow of the stock (Lueck, 1995, 422). Sometimes property assignment is limited to flows of output because extraction is more easily measured than the stock itself (Libecap, 2006, 8). For instance, instead of establishing property rights on an entire oil well underground, property rights are only possible on pumped oil; instead of establishing property rights on herds of wild animals, property rights are only possible on captured and killed game; instead of establishing property rights on entire streams or rivers, property rights can only be established on water taken from them.

Capturing only flows creates risks of *an open access dissipation* (see also Chapter 4 in this volume). With an increasing number of users the marginal return to the effort of using declines. Due to the lack of any restriction, the number of users increases until the marginal return is equal to the marginal effort, which means that all rents from the flow of the resource are dissipated (Lueck, 1995, 403). Take, for instance, a river in an arid area, submitted to an open-access regime of capture. The evolution of returns is as follows:

Table 5.2

| Number of Users | Effort Cost | Average Return | Total Profit |
|-----------------|-------------|----------------|--------------|
| 10 | 10 | 100 | 900 |
| 20 | 10 | 90 | 1600 |
| 30 | 10 | 80 | 2100 |
| 40 | 10 | 70 | 2400 |
| 50 | 10 | 60 | 2500 |
| 60 | 10 | 50 | 2400 |
| 70 | 10 | 35 | 1750 |
| 80 | 10 | 20 | 800 |
| 90 | 10 | 10 | 0 |
| 100 | 10 | 0 | -1000 |

The optimal amount of users is 50 while under an open-access regime additional users will appear until the cost of effort is equal to the average return. Consequently, the number of users will increase up to the number of 90. At that number profits of water use are zero and rents are entirely dissipated.

This theory suggests that several institutions, legal as well as customary, which regulate flow capture, can be explained as attempts to solve or to alleviate this problem of overuse. We can distinguish the following ones:

3.1 Common property arrangements and regulations

The open access is restricted to some users. By this a kind of common property on the asset is introduced, the commoners being the ones entitled to capture. This can lead to more optimal use-levels. On the other hand exclusion costs may increase. Because there is an inverse relationship between exclusion costs and the number of included, the trade-off between exclusion costs and costs of rent dissipation may lead to a number of users, which is higher than the optimal amount (Lueck, 1995, 406). Examples of such a common-property arrangements are:

(1) *Riparian rights*: the system of riparian rights prevails in England and in the eastern American states. It is based on old common-law doctrine. Water rights are tied to ownership of land, bordering the water. Owners (or people with a derived right) of such land are entitled to correlative and reasonable use of the water. The water rights cannot be sold apart from the land (Lueck, 1995, 427; Rose, 1990). The system creates a common property regime of landowners adjacent to the water. Due to the restriction the users are able to control each other in order to prevent overuse and dissipation. The common property regime by the bordering landowners permits also a low-cost control. Downstream owners will suffer from overuse or pollution from upstream owners and will react quite swiftly. The setting up of expensive overarching control agencies can be avoided in this way. In the west of the United States the prior appropriation rule prevailed (Lueck, 1995; Libecap, 2006, 28). This rule allowed possession of a stock of water also for non-riparian owners. Lueck explains the difference with the Eastern rule by the extensive diversion of water away from riparian land, such as mining and irrigation (Lueck, 1995, 428)

(2) *The commons*: in most villages in Europe some land, such as wasteland and pasture-land, was held in commons. All families of the village were entitled to use this land for game keeping, for gathering dead wood and for grazing their cattle. Because the villages were involved in long-term and multiplex relationships, rules on overuse were easy to implement. In fact, most historical commons do not reflect the dramatic picture of the tragedy of the commons as depicted by Hardin (Ellickson, 1993; Lueck, 1995, 422). As far as arable land was concerned a semi-commons prevailed (Smith, 2000). Between the early spring and the time of harvesting private

property on the strips of arable land prevailed. During late autumn and winter the fields were used for grazing the cattle of the whole village. By rotating private and commons regimes the farmers were able to maximize the use of their land for crop growing as well as for cattle raising purposes. This semi-commons system collapsed with the development of large inter-regional markets for agricultural products. These markets allowed land being exclusively used either for crop growing or for cattle raising (Smith, 2000; Stahl-Rolf, 1998; Stahl-Rolf, 2000).

(3) *Wild game*: in feudal England, the right to capture game was a privilege enjoyed by feudal lords. This restriction, based on class origin, limited access and probably prevented inefficient over-hunting (Lueck, 1995, 424). It was expected that the collapse of this feudal privilege system would lead to overuse and rapidly declining populations of wild game. This was effectively the case at the beginning of the French Revolution, when all farmers suddenly started to hunt pigeons and rabbits, mainly in order to protect their crops (Shama, 1989). As a consequence, strict regulation had to be imposed to control the hunting of game in France. Also in England, game hunting privileges were abolished during the nineteenth century and ownership rights to wild game were granted to all landowners. The effect was, however, far less dramatic in England than in France. The enclosure movement had created large consolidated holdings. This permitted large wild game stocks to live on a few holdings. Agreements to control game capture remained as a consequence easy to reach and to implement. In America, with its scattered private landholdings (see also the Homestead Act) and its wide-ranging species, control of game capture by private owners was difficult, so states were granted extensive regulatory control over the access and use of wildlife.

(4) *Unitization contracts*: by contracts between those with surface access to oil and gas they coordinate their actions in order to mitigate rule of capture waste. Access to oil and gas underlying numerous surface holdings is limited through space-requirements limiting density of wells and prevent adjacent surface owners from drilling along their property lines to deplete their neighbours' reserves. States also compel the formation of reservoir units, if a supermajority of the surface owners agree (Lueck, 1995, 426).

3.2 *Intensive and stable group interaction*

As mentioned already in quoted examples, multiplex relationships between the members of the capturing community will stimulate spontaneous (that is, not imposed and not enforced by an external authority) restriction of the use of flows and the prevention of open-access dissipation. If

some members of the same community care more than others about the common and the future wealth of it (moral entrepreneurs) they will be able to develop restrictive rules and practices, which can be enforced by second-party control (tit for tat, because multiplex relationships imply repeated games) and by third-party control, based on gossip and reputation (Ellickson, 1991). Historical examples of such close-knit societies, restricting spontaneously the capture of flows, are easy to find: the 'commons' of agricultural villages; hunting and fishing rights in tribal societies (Johnsen, 1986); customs of lobstermen in Maine (Acheson, 1989).

3.3 Maintaining homogeneous group membership by equal contingent rules

Often groups whose members are entitled to flow capture apply a rule following which each member is entitled to a same amount of capture. At first sight such a rule seems to be inefficient, as the highly productive capturer will spend too little effort, while the less productive too much. It is possible, however, that equal-contingent rules are maintained in order to stimulate homogeneity of group membership. These rules force a group to preserve homogeneity by screening potential members, by indoctrination and by limiting the transfer of membership rights (see below) (Lueck, 1995, 408).

By preserving homogeneity the group prevents the more efficient capturers from eliciting a race for capturing, which leads to overuse and open-access dissipation. As an historical example we can quote the equal access of English villagers to the common resources (pasture – grass, estover – wood, diggings – coal and stones, turbarry – turf and peat, piscary – fish) (Lueck, 1995, 422).

3.4 Restriction of transfer of the right to capture

Restrictions of trade are usually inefficient as they hamper the allocation to the highest bidder, on average the most efficient user of the good. When property rights can be established on entire stocks, limits to transfer, which might have existed for religious and military reasons, tend to disappear. The gradual commodification of land in European legal history serves as an example. When rights can only be established on flows of stock, the restriction of transfer may find its economic rationale in the preservation of homogeneous membership and the avoiding of open-access dissipation (Lueck, 1995, 409). When rights of capture are transferable a rapid decline of homogeneity may be expected as rights will be always traded to more efficient users, offering a price which is higher than the expected capture returns of the present user. Consequently, trade of capture rights will lead to heterogeneity of users, possibly leading to a race for capturing.

Examples of such restrictions of trade are: the rights of English villagers to the commons, the right of riparian owners to use water for household consumption. Also the US/UK distinction concerning the trade of wildlife products can be explained by the different property situation of wildlife stocks. In the United States this trade is submitted to severe restrictions. Concerning wildlife stocks a rule of capture exists. Harvest pressure on the flow is limited by trade restrictions. In the UK rights on wildlife stocks are well defined and privately held. As a result trade serves only to generate wealth and does not dissipate the value of the stock (Lueck, 1995, 424).

4. Definition of possession as a title for initial acquisition

Under a rule of first appropriation the person who took the first control over the concerned asset becomes the owner. This apparently simple rule is, however, often difficult to apply to practical cases as questions may arise about the concrete acts and signs necessary to establish factual control. This is illustrated by the famous case *Pierson v. Post, 1805*. Post was hunting a fox on an unowned beach. He almost had the beast in his sights when an interloper appeared, killed the fox and ran off with the carcass. Post sued on the theory that his pursuit established his property right to the fox. The court, however, decided otherwise, arguing that only the one who killed or at least mortally wounded the animal and thereby bringing it under a certain control had a claim to ownership. One can find similar cases in all legal systems, about which long doctrinal debates developed. Does economics have to say anything in this debate? Can we develop an economic criterion for an efficient definition of possession in order either to apply the first appropriation rule or to fix the beginning of prescription in case of adverse possession? From an economic point of view the definition of possession should meet two criteria: clarity and stimulation of heterogeneity of potential claimants.

4.1 Clarity

The acts and circumstances which serve as a sign of possession should be clear and unambiguous to the members of the legal community. They must reveal in a clear way one's intent to appropriate. By linking ownership rights to unambiguous, visible signs of possession further inefficient racing for a specific asset and endless trials about possession are avoided. The preference for clarity is illustrated by the famous case *Brumagin v. Bradshaw* (39 Cal. 24 1870; Rose, 1985). The case concerned a considerable amount of land in the Potrero district of San Francisco. Before this land had become a residential and commercial area, it had been settled by a certain George Treat, who pastured livestock on the land. The party which claimed through Treat alleged that the latter had repaired a fence

across the neck of the Potrero peninsula. The other party alleged that outsiders could still land in boats and that there was a gap in the fence. The court ruled that a jury should consider whether Treat's fences gave sufficient notice to the public that he had appropriated the property.

Also in the case *Pierson v. Post*, the court ruled in favour of Pierson, who killed the fox and took the carcass. The court decided in favour of the party which had put itself in the clearest position of possession and about which uninformed outsiders would most likely recognize the possession. The preference for clarity in the definition of possession implies also a trade-off between inefficient racing and litigation costs on one hand, and the impairing of incentives of efficient appropriation by saucy intruders on the other hand. In the case *Pierson v. Post*, Pierson free-rode on the efforts of Post. Such a ruling could stimulate free riders' attitudes in general, by which efficient appropriative behaviour would be hampered and suboptimal appropriation levels would prevail (Rose, 1985). Dharmapala and Pitchford analyze the dissenting opinion of Justice Livingstone in this case and reach some different conclusions. Flushing out foxes by hounds and killing the foxes are not substitutes but are fully complementary. The rule, adopted by the court, might have been socially suboptimal when killing foxes in order to protect farmers was the main social objective. As most foxes were not hunted in open access land, as was the case in *Pierson v. Post*, and as the case was driven by very personal concerns of honour, the social loss of the ruling of the court was probably minimal. According to the model of Dharmapala and Pitchford, however, the Livingstone rule seems to be the optimal one in other circumstances and not the rule of the court (Dharmapala and Pitchford, 2002).

4.2 Stimulation of heterogeneity among claimants

As mentioned already (see Section 2) the dissipation of rental streams is the highest when potential claimants are homogeneous. By defining possession in a certain way it is possible to influence the homogeneity-heterogeneity level of potential claimants and to prevent rent dissipation to a certain extent. As a consequence, some possession rules may find their economic rationale in the stimulation of claimants' heterogeneity. The following examples can be given:

(1) *Finders keepers rule for finds*: this rule applies often for treasure trove, abandoned property (voluntary parting) and lost property (involuntary parting). Salvage rules under maritime law, however, allow for a division of the spoils (sunken ship and their cargo) between finder and the former owner (Hallwood and Miceli, 2006). Art. 716 Code Civil (Belgium–France) also allows for a fifty–fifty division of treasure trove

between finder and owner, when the treasure is found on somebody else's land (see also art. 939 Code Civil Quebec) (Dukeminier and Krier, 1993; Lueck, 1995, 413). The finders keepers rule limits competition among potential claimants to time 'first come first served', by which appropriation becomes largely dependent on random factors. Consequently, other potential claimants than the finder are not able to eliminate heterogeneity by investments.

(2) *Telepossession*: in the case *Columbus-American Discovery Group Inc. v. Atlantic Mutual Ins. Co.*, 1992 [974, F. 2d 450–4th Cie 1992] (Lueck, 1995, 413) the court allowed the establishment of rights on a sunken treasure through the use of remote video cameras which produced live images. It did not require physical possession, but coined the term telepossession. By such a definition of possession in this case the court maximized heterogeneity among sea explorers and prevented costly duplication in exploration.

(3) *The Homestead Act 1862*: this already mentioned Act (see Section 2) seems to refute the thesis of efficient definition of possession. Rather, the procedures of this act concentrated on stimulating the homogeneity of potential claimants through publicly announcing and promoting the homesteading of the concerned areas. Further elements of the historical context of this act, however, offer an explanation of these procedures. On the one hand, auctioneering and land sale by the government, the most used procedure prior to the Homestead Act, proved to be too costly for the frontier (definition and division of land tracts). On the other hand, squatting on the land at the frontier increased rapidly, which created rising problems for protecting the squatters against Native American tribes and criminal gangs. By opening blocks of land tracts to the public, by organizing races among many potential claimants for these tracts, dense settlement of land was promoted, by which land enforcement costs were mitigated (Allen, 1991; Lueck, 1995, 414). This conclusion is, however, contested by Anderson and Hill, who contend that the Homestead Act was inefficient, certainly for the more arid lands in the West. The inefficiency of the Act can be explained by the lack of residual claimants (Anderson and Hill, 2002, 506)

(4) *Hard rock mining*: the American General Mining Law of 1872 establishes a first appropriation rule for mineral rights on public lands. The miner who discovers a valuable mineral deposit, locates the claim and does the assessment work, can apply for a patent. While prospecting, he is protected by the doctrine of *pedis possessio*. The law protects the possession

of the miner in order to obtain a patent eventually later on, at the moment when heterogeneity is the highest, that is, at the moment of the discovery (Lueck, 1995, 416).

(5) *Intellectual property*: for this type of property, mostly a first to invent policy is followed by applying the rule of acquisition by creation (Dukeminier and Krier, 1993).

The auction alternative would only be possible here after the invention or creation, which would impair incentives for research or artistic creativity a lot. Several studies point to the fact that the law tends to grant the invention ownership very early, when claimant heterogeneity is still large. Also courts tend to grant broad patent protection when a new invention signals room for many improvements, thus preventing a race for ownership. When an idea has limited room for improvement, only a narrow protection is granted (Grady and Alexander, 1992).

(6) *Whaling norms*: as for wild game the rule of first appropriation may pose a problem for whale fishing. Often whales are pursued by one ship, harpooned by another and, after breaking loose, killed and captured by a third ship. Customary rules were developed among whalers which reflect the avoidance of wasteful races by fixing possession at the moment of high heterogeneity. Such rules were sometimes upheld by court decision such as the rule that the first party to shoot the whale with a 'bomb-lance', gained rights over it (see *Gehn v. Rich* [8F.159 (1881)]); Dharmapala and Pitchford, 2002, 45). These rules differed, however, according to the kind of whale being fished. When the right whale, a docile kind of whale, was mostly fished, whalers applied the 'fast fish-loose fish' rule, that is, the whaling boat which kept the whale to the boat with the harpoon was the owner. If the whale got loose, it was open again for catching. This rule preserved maximum heterogeneity. When whale fishery turned more to the catching of sperm whales, a very energetic kind, whalers applied the 'iron holds the whale' rule, that is, even when the fish got loose but the boat whose harpoon was in the whale remained in fresh pursuit, this boat preserved its possession. The other rule became unpractical because sperm whales, once harpooned, could sink the boat by diving. As a consequence, a rule which preserved heterogeneity too, but was less dangerous, was applied (Ellickson, 1991, 195).

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