INCOMPLETE RIGHTS AND THE EVOLUTIONARY COMPLEMENTARITY BETWEEN PROPERTY RULES AND LIABILITY RULES

by

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In this paper we argue that traditional explanations for distinct application of property and liability rules are somehow misleading, since they tend to neglect the evolutionary complementarity between the two rules in a world of incomplete property rights characterized by high transaction costs in rights definition. When rights are a complete bundle of well-defined uses, property rules are the way in which the correlation between rights and duties is respected. In a world of incomplete rights, externalities over undefined uses call for a Court intervention aimed at defining a new property right through property rule either liability rule. Independently of whether new rights are created by property or liability rules, the nature and the extent of future externalities over conflicting undefined uses could generate new processes of right definition. The emergence of an externality always implies an evolutionary complementarity between property rule and liability rule whose boundaries actually depend, in alternative legal systems, on the degree of incompleteness of original rights.

Keywords: property rule, liability rule, incomplete rights, externality

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I Introduction

The 1972 pioneering article of Guido Calabresi and Douglas Malamed on “Property Rules, Liability Rules, and Inalienability: One View of the Cathedral” really represented a breaking in the path of how lawyers and economists think about the function of legal rules, such as property rules, liability rules and inalienability rules, in protecting property rights. C&M uses the Monet’s series of paints of the Rouen Cathedral as a metaphor to say that, as each Monet’s paint of the same subject, their theory was just one view of the cathedral. Given the powerful and suggestive metaphor that frames the structure of the paper, the article is widely known and referred to as simply the cathedral. Since 1972, many scholars have delivered generous accounts of it in their works. Only from 1981 to 1996, Krier and Schwab (1997) counted at least 483 articles quoting the cathedral. As for other famous writings, with which the cathedral shares the top of the most cited ranking, also the work of C&M has been from time to time defined as "highly subversive" (Epstein 1997), or either landmark (Melville 2000), seminal (Bebchuk 2001) and path-breaking (Bell and Parchomovsky 2002) and if in 1971 it almost risked to be rejected by the Harvard Law Review (Calabresi 1997), according to many, the cathedral


is one of the few corner-stones on which the all the law & economic movement is built upon.

This enormous production of articles about the cathedral is, in our view, not only the best indicator of the brilliant intuition made by C&M, but also a clear evidence of the many facets risen by their stand. Looking through this wide literature we can certainly affirm that a comprehensive theory on property rules and liability rules, aimed at unifying in a unique theoretical perspective apparently opposed positions, is still missing.

Inspired by the solemnity of the cathedral, we add in this paper another view of the same from its hidden foundations, i.e. from the baseline perspective of the transaction costs that ought to be sustained in order to initially define the rights rather than those faced at a later point to protect the same rights, trying to unify the main theses of a long and uninterrupted debate.

Calabresi and Melamed provided a theory, both positive and normative, on the meaning of property rules, liability rules and inalienability rules as alternative stylized forms to protect property rights.

As we will briefly recall in section two, the main message of C&M theory was that, inalienability apart, legal rules may protect a property right in two main ways: by inhibiting any taking without owner’s consent (property rule) or by imposing on infringers a duty to compensate owners for infringement (liability rule). The above distinction - which somehow goes beyond property rights regarding the category of remedial choice of rule violations in property law, contract law, tort law and criminal law (Epstein, 1997; Posner, 2000) - has in C&M’s view, also a prescriptive nature: property rules should be applied when transaction costs of legal protection are low, whereas liability rules should be preferred when the transaction costs of legal protection are high. From this general intuition, two main approaches have been developed: one stressing the dominance of property rules (Epstein, 1997); the other emphasizing the superior efficiency of liability rules, regardless the dimension of the transaction costs to be sustained in protecting rights (Kaplow and Shavell, 1996; Ayres and Talley, 1995).
In this article we argue that C&M contribution, as well as the two main subsequent approaches outlined above, share a common feature which need to be clearly pointed out: the assumption of ownership as complete bundle of uses protected by well-defined property rights. The focus of C&M is on the ex-post transaction costs to be sustained for protecting well-defined property rights from infringement. Our focus here is on the ex-ante transaction costs which ought to be sustained in order to clearly define an entitlement over every use bundled in a property right. The diverse focus of our analysis is based on the simple idea that in a world of zero ex-ante transaction costs in defining rights, every right is correlated to a correspondent duty not to interfere upon non-owners, as in the well-known contribution of Hohfeld\(^5\) (1917). In this ideal world, any non-consensual taking is refrained via property rules regardless of the dimension of transaction costs in protection. Liability rules, in our view, do emerge in a world in which high ex-ante transaction costs in defining a right for every use bundled in a property right inhibit the definition of a complete ownership right and determine ownership as a residual right to control over a bundle of uses, some known, contractible and protected by property rule and some unknown, undefined and unprotected (Hart, 1995).

As a consequence, the question of choosing property rules vs liability rules is not a general matter regarding all transactions but a choice, which is inherent only to those undefined uses generating an externality, and thus not already protected by a property rule. This means that, according to us, undefined uses are the main source of an externality. We define an externality as a conflicting reciprocal claim over a rival undefined use since, when rights are well defined, a non-consensual claim against a well defined property right could not be enforced without violating a pre-existing jural.

\(^5\) In general to each legal position correspond a jural opposite as well as a jural correlative. On further elaboration of Hoefeld's finding, see Morris (1993) and Pagano (2000)
correlation of rights and duties. Only when there is an externality, and a dispute over it, the choice between property rule and liability rule is relevant.

We maintain that, in order to solve an externality, a Court may choose property or liability rules, as in C&M’s approach. However, in our argument, this choice is not determined by the transaction costs of protection; rather, when efficiency considerations are taken into account, by Court’s assessment of parties’ future bargaining power which is generated by Court’s rights definition, given that property rule and liability rule affect parties’ default point in future bargaining.

In our setting, the traditional distinction between property rules and liability rules is not dependent on the transaction costs of protection, neither on Court’s evaluation of asymmetric information, nor on the degree of tangibility of assets. It depends on the degree of completeness of property rights and on Court’s attitude towards the impact on parties’ ex-post contractual power of new right redefinition.

We thus add to the two steps identified by C&M (assignment of property rights and decision over the rule by which the right should be protected) a third but preliminary step represented by the process of rights definition performed by Courts in settling dispute over externalities. When rights are incomplete, either when the conflict regards undefined uses (and undefined duties), Courts always redefine the original bundle of rights.

We finally argue that property rules and liability rules, being alternative instruments of defining new rights over undefined uses, co-evolve in a complementary way: new property rights created by a Court’s decision over an undefined use (regardless of having been created through a property either a liability rule) are always protected by a property rule (non owner must not interfere), but they are nonetheless exposed to potential externalities which might eventually raise with respect to the undefined uses bundled in the new property right.

The article proceeds as follows. In section two we provide a critical short review of the main issues raised in the law and economics literature. In section three we investigate the
complex relationship among property rules, liability rules and externalities. In section four we outline the main reasons to argue in favour of an evolutionary complementarity between property rule and liability rule.

II The Cathedral and its representation

We do not contend that the cathedral was very much in sight already when Ronald Coase (1960) wrote his masterpiece, however, C&M themselves recognise explicitly the profound influence that the problem of social costs exercised on their work. Coase was not very much interested in explaining how legal entitlements are allocated and protected as much as he was concerned with the problem of externalities: the costs/benefits of somebody's activity borne/enjoyed by third parties, that are not captured via the price system. Overcoming Pigouvian theory, Coase observed that externalities are reciprocal in nature and that -in principle- injurers as well as victims can eliminate harm. Realising this simple evidence allowed him to hypothesise that private bargaining can be a substitute for regulatory intervention and tort disputes as a mean of internalising externalities and thus addressing the problem of social costs. Coase undermined Pigou's analysis by conjecturing a frictionless state in which transacting is costless. In such a world -he showed- entitlements would eventually end-up in the hands of who value them the most through private bargaining and regardless of whom the entitlements were initially assigned to and provided that clearly defined property rights were in place

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The latest part of the previous statement, arguably the most relevant to our purposes, has been proven to be misleading to say the least. In fact Usher (1998) showed that, absent transaction costs, efficient outcomes can be reached even if no clear allocation, hence property rights, are initially in place.

The world Coase had in mind was actually one with positive transaction costs. In this context legal rules that define, assign and protect legal entitlements become relevant. Courts and administrative bodies need to carefully consider costs and benefits of allocating entitlements to one party as opposed to another in a manner which maximises the value of production (Coase, R. 1960) since the initial allocation, when transaction costs are significant, inform the final distribution of entitlements. The relevance of Coase's findings is nested in the rehabilitation of private bargaining and contractual arrangements as means of addressing externalities. However Coase's results apply ex-post "once property rights are defined" and say little about how they should firstly be established and protected after the initial allocation. His masterpiece opened up the grand season of the law and economic movement. However it left courts and lawmakers, already troubled by the daunting mission of promoting equity or social justice, with few practical insights on how to decline their new burdensome task of enhancers of economic efficiency.

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incoherent or wrong." Economic Letters, 61, pp. 3-11. concluded that "Interpreted as a general reminder that the economy runs on a mixture of price-taking and deal-making and that bargaining is no free good, the Coase theorem is instructive but misnamed as a theorem. Interpreted to mean that costless bargaining promotes efficiency in the economy, the Coase theorem is a tautology, for a bargain among rational people must make each person better off than he was before [...]. Interpreted as implying that efficiency in the economy requires an allocation of property to people, even when bargaining is costless, the Coase theorem is incoherent or wrong

7 The world of zero transaction costs has often been described as a Coasian world. Nothing could be further from the truth. It is the world of modern economic theory, one which I was hoping to persuade economists to leave Coase, R. H. 1988. The firm, the market, and the law. Chicago: University of Chicago Press.
II. 1. The first paint

C&M's piece of research was meant at casting new light on the way legal systems allocate and protect legal entitlements across society. They built upon the -then recent-contribution of Coase in many respects, nonetheless their achievements outstripped Coase's legal findings especially by offering normative instruments to law practitioners. They borrowed from Coase the disenchantment towards who ought initially to posses the entitlement and took an agnostic position in this respect. The entitlement -they argued- should be assigned according to criteria based on economic efficiency as well as on other considerations such as society's distributional preferences and other justice reasons. In this respect, they simply enriched Coase's account of court's behaviour by recognising that judges usually apply other criteria in their decisions that go beyond the mere economic efficiency. However the task of the court does not end here. The next step courts must go through is to decide which instruments these entitlements should be defended with. Judges have multiple legal instruments at their disposal. One of the cathedral's major achievements was to organise these vast array of tools in a coherent tripartite family made of (i) property rules, (ii) liability rules and (iii) inalienability rules, organised along the lines of a transactional framework that specifies the conditions of legitimate transfer (Kraus, Jody and Jules Coleman 1986). Property rules confer to the holder of the entitlement the exclusive power to exclude others from using it along with the power of alienating it at the price fixed exclusively by himself. Thus, all non-consensual transfers would meet with an injunction by the court. Conversely, liability rules grant to non-holders the power to take the entitlement, even without consent of the holder, and pay a price accordingly determined by the court or the legislator. The holder, in this case, retains the right to seek damages but does not control exclusively the

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8 The word "entitlement", was a relatively new concept in law at the time C&M were laying their work and was used by the US Supreme Court to describe the expanded conception of property as a matter of due process in court's decisions Merrill, Thomas W. and Henry E. Smith. 2001. "What Happened to Property in Law and Economics?" Yale Law Journal, 111:2, pp. 357-98..
entitlement any longer. Finally, inalienability rules rule out any transfer of the entitlement regardless the consensual vis-à-vis non-consensual nature of the alienation. Putting aside the inalienability rule\(^9\), C&M further noticed that property and liability rule protection may be granted to either parts of the conflict.

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<thead>
<tr>
<th></th>
<th>A (plaintiff)</th>
<th>B (claimant)</th>
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<tbody>
<tr>
<td>Property rule</td>
<td>Rule I</td>
<td>Rule III</td>
</tr>
<tr>
<td>Liability rule</td>
<td>Rule II</td>
<td>Rule IV</td>
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Krier & Schwab(1995)

This insight swiftly led them to formulate their famous four-rule taxonomy of choices available to courts.

Using the C&M example of the polluting factory, let us suppose that society decides that neighbourhood (our plaintiff) interest in clean air is the entitlement that ought to be underpinned. When residents invoke court's intervention, the latter can decide to enhance their right to clean air either by commanding the factory to stop polluting (rule I) or by conditioning the continuation of its activities upon the payment of a congruent damage to the residents (rule II). Conversely, if factory's activity is the entitlement that ought to be preserved, then the court can permit it to continue to pollute (rule III) or conferring the right to residents to stop pollution by paying damages to the factory (rule IV). Rule IV

Rule I, II and III were traditionally applied by courts. However, the C&M framework allows us to see the situation is a two-by-two matrix where the columns show that the

\(^9\) As the same title of the cathedral highlights, Calabresi And Melamed they also envisaged an inalienability rule, which excluding some remarkable exceptions (see for example Rose-Ackerman Rose-Ackerman, Susan. 1985. "Inalienability and the Theory of Property Rights." Columbia Law Review, 85, pp. 931. have received much less attention
entitlement could be awarded initially to either P or C, and the rows show that the entitlement could be protected by a property rule or a liability rule. The matrix immediately reveals a "missing element" which assigns to Ban entitlement protected by a liability rule, meaning that B can force A to stop polluting provided A pays compensation determined by the court.

The cathedral was an innovative piece of work in at least one further respect. Once established the property rules vis-à-vis liability rules dichotomy, it offered a simple yet powerful criterion to be followed in the choice of using one rule as opposed to the other. And this is where Coase comes suddenly back into the picture, pardon, in the painting. C&M proposed property rules to be employed when transaction costs are low: when there are few parties involved and when they are readily identifiable and prone to bargain. Conversely, liability rules achieve superior outcomes in high transaction costs settings, when strategic bargaining, information asymmetries and all sorts of costs that prevent smooth bargaining are at work.

II. 2. The paint, the picture and the movie of the cathedral

The strength and insightfulness of the cathedral is that it is little more than an outline—a way of looking at things. As such it leaves room for others (Calabresi, Guido 1997). Indeed in the 30+ years since its publication many others have tried to fill that room. Since the first view of the cathedral was painted many other oils, frescos and tapestries have followed. The work of C&M has been first stretched to cover new issues such as antitrust (find citation, maybe Bell again), public law and international relations (Melamed, A. Douglas 1997). Later the paint has been worked out in a more detailed picture. In the nineties the

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10 At the time C&M wrote the cathedral there was no record that rule IV had been applied in US courts. Indeed, by the time the paper was published, the Arizona Supreme Court (find ref for the case) applied it in the resolution of a dispute. Indeed, as recognised by Calabresi himself Calabresi, Guido. 1997. "Remarks: The Simple Virtues of The Cathedral." Yale Law Journal, 106:7, pp. 2201-07., rule was envisaged earlier although C&M where not, at the time, aware of these previous findings.
C&M framework was adapted to accommodate new legal rules, not originally envisaged by C&M, that were popping-up in the literature and that remarkably enriched the well-known four-items menu. After the comprehensive systematisation by Morris (1993), new proposals for interpreting the C&M rules as put rather than call options have emerged in the literature. Rule 5, which suggests that the claimant can chose to abate its tortious activity and collect the damages from the victim, was first suggested by Krier & Schwab (1995) and later rule 6 was also added. The breach Krier & Schwab opened in the granitic cathedral thrilled many scholars to look for other rules not originally envisaged by C&M. Few years later, Levmore (1997) articulated a full scale of up to sixteen rules.

The picture became thus more complex, and soon the debate moved from the static world of the cathedral paintings to a more dynamic set. By focusing their attention on static property and liability rules, Calabresi and Melamed have obscured the possibility of protecting legal entitlements by means of dynamic rules (Bell, Abraham and Gideon Parchomovsky 2002). The canvas has later become a cinemascope in order to get a sense of what is going on over time in the evolution of property rules and liability rules.

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12 Levmore (1997) divided up C&M's four rules along the lines familiar to the common practice of courts. In the context of liability rules recognise that injurers are often recognised liable only if they acted negligently. From the common law distinction between torts and unjust enrichment, Levmore proposed to distinguish when proper compensation is measured upon the victim's loss or rather on the injurer's gain. He also noted that the court may choose whether to grant compensation for either past or future damages and so on.

II. 3. The bell-towers of the cathedral

It is worth noticing that all the refinements to the C&M framework still insist upon the dichotomy between property rules and liability rules. One of the remarkable achievements of the cathedral was that it pointed out for the first time the paradigmatic distinction between property rules and liability rules (Posner, Richard A. 2000), as a distinction between ex-ante consent and ex-post compensation as sufficient conditions for private taking. However, it is arguable that C&M intended this distinction to be only one view of the cathedral: a metaphor that comes to be of normative significance once the Coasean theory of transaction costs comes into the picture. C&M's work suggests that in contexts where transaction costs are high the court should opt for liability rules whereas when transaction costs are low the opposite holds true. By moving into the normative side, C&M focused on the role of transaction costs rather than on what property rules and liability rules are and how they should be protected. The innovative descriptive side of their work (having conceptually organised the protection of legal entitlements in property rules and liability rules) is mainly functional to their normative part (when transaction costs liability rules are preferable). Absent transaction costs, the dichotomy becomes almost meaningless because both rules are equally efficient (Ayres, Ian and Eric Talley 1995b; Cooter, R. and Thomas Ulen 1988; Polinsky, A. Mitchell 1980). Absent transaction costs there would be little reason to group up legal instruments and divide them in property rules and liability rules.

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15 Coase developed his theory of transaction costs already in his early work on the nature of the firm (1937). However, the relevance of transaction costs fully spills out of his second masterpiece on the problem of social costs Coase, R. 1960. "The problem of social costs." Journal of Law and Economics, 3..
As Kraus & Coleman (1986) argued, the property-liability-(inalienability) framework concerns only transactional aspects of institutional entitlements: it is *one view of the cathedral* taken from the transactional standpoint.

However, once the two bell-towers of the cathedral were erected, the debate got somehow stuck into the dichotomy eventually loosing the sight of the transaction costs problem that was originally lying at the hearth of the distinction. In particular the debate has ended up in being a race to find out which rule is more efficient at minimizing overall transaction costs. A contest that has been, from time to time, fought on the ground of: consistent investment decisions; strategic bargaining; information harnessing activity by the court; strategic information; victims behaviour and injurer behaviour; undercompensation and overcompensation; risk aversion, and endowment effects, among other things.

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19 (Ben-Shahar, 2000 #143) arguing that the costs to acquire information in the case of liability rules as compared to the case where property rules are in place maybe higher due to strategic play with private information.


No clear winner emerges from the contest, and indeed supporters of one rule or the other must cope with the fact that we live in a world where property rules and liability rules coexist and we observe a variety of reasons why a rule is applied as opposed to the other.

Those that underpin the superiority of the property rule cannot explain the growing recourse to liability rule in the context, among others, of environmental externalities: neither they can stand the growing creative ways in which liability rules are increasingly applied in tort law as well as, to name two examples, in the field of intellectual property and antitrust law (Bell, Abraham and Gideon Parchomovsky 2002).

On the other side, all those that support the superiority of liability rules can hardly explain why property rules are so pervasive throughout the legal system (Epstein, Richard A. 1997) and seem to defeat any call for reversing their dominance (Merrill, Thomas W. and Henry E. Smith 2001).

As Judge Calabresi pointed out: This debate is certainly worth heaving, but it is not as interesting as the question of when we want to use a remedy rather than another for broader reasons (Calabresi, Guido 1997). Furthermore, we argue that the debate over whether property rules are superior vis-à-vis liability rules and vice versa is worth having only as long as we stay within the boundaries of transaction costs first envisaged by the Calabresi and Melamed.

II. 4. Kaplow and Shavell's view of the cathedral

Kaplow's and Shavell's contribution (1996) certainly was one of the most important steps of the fine-graining exercise that the academic community has conducted over the cathedral. They added an important distinction to the universe of entitlements by suggesting that we shall distinguish between externalities and takings being these two different sources of disputes over entitlements. Their paradigmatic example of the former is the recurring case of the factory polluting a neighbourhood and generating nuisance. As an example of the later, they took the case of a dispute over the property of a laptop computer. In a nutshell, they argued that property rules are superior in cases of takings, irrespective of whether transaction costs are high or low. This is because liability rules generate problems of reciprocal takings, meaning that a thing can be sequentially and endlessly subtracted from one part to the other upon the payment of a fixed amount of damages. Conversely, in the externality cases, the optimal choice of legal rules crucially depends upon the magnitude of transaction costs at work. When transaction costs are low, as argued before, the to rules are perfect substitutes since parties can bargain effortlessly to achieve optimal allocation of resources. However, when transaction costs become high, courts should opt for liability rules because they minimise information costs to the courts and not because -as C&M argued- of the impossibility of bargaining. This conclusion relies on the observation that in allocating an entitlement via a property rule, the court must know both the damage to the victim and the prevention cost to the injurer whereas, when using a liability rule, the court needs to know only the

damage to the victim. This means that liability rules, in the context of high transaction costs, are less costly, thus more efficient for the courts.\(^\text{27}\)

<table>
<thead>
<tr>
<th>Taking of things</th>
<th>Harmful externalities</th>
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<tr>
<td>Property rule</td>
<td>Liability rule</td>
</tr>
<tr>
<td>(avoid reciprocal takings)</td>
<td>(lower costs unless there are judgment-proof problems)</td>
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The analysis of Kaplow and Shavell (1996) sets out the important distinction between *taking of things* and *harmful externalities*; however, it leaves the distinction between the two categories largely unspecified. Although they recognise that a clear-cutting miss the grasp on what eventually differentiate them, they argue that the distinction is largely used in such contexts as industrial pollution, automobile accidents, and transfer of things and it is used in the legal literature. Moreover, they argue that takings imply problems of potential reciprocal takings whereas harmful externalities present a high level of independence between the injurers' benefit and victim harm (Kaplow, Louis and Steven Shavell 1996).

### III Property, liability and externalities

The enormous debate generated after the path-breaking article by Calabresi and Melamed, in particular between those who claim the dominance of property rules and those who defend the superior efficiency of liability rules, shows surprisingly a common distinguishing feature: the idea that the original property right either the entitlement

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\(^\text{27}\) This result can be undermined in some circumstances such as when the injurer is not judgment-proof.
whose best protection device need to be assessed is a clear defined or complete right. From this implicit assumption derive a number of relevant implications and ambiguities, which need to be clearly pointed out in order to properly assess the meaning and the extent to which applying property and liability rules.

According to one of the most well-known definitions of a property right, property is a bundle of rights. These rights describe what a person may or may not do with the resources he owns: the extent to which he may possess, use, transform, bequeath, transfer, or exclude others from his property. [...] The owner is free to exercise his rights over his property, by which we mean that no law forbids or requires him to exercise those rights. [...] The legal conception of property is, then, that of a bundle of rights over resources that the owner is free to exercise and whose exercise is protected from interference by others. [...] Property creates a zone of privacy in which owners can exercise their will over things without being answerable to others (Cooter, R. and Thomas Ulen 1988, p.91).

Using Hohfeld's correlatives (Hohfeld, Wesley Newcomb 1917), we may thus suggest that a property right induces a correspondent bundle of duties: non-owners have a duty not to interfere with every single use bundled in the property right. How rich is however this bundle? How to define the content of the bundle of uses embedded in a property right, and consequently the content of correspondent duties?

Traditional theory of property as a bundle of uses disregards the above questions and it seems to be based on an implicit assumption of completeness of property right: the bundle of uses included in a property right is always complete and well-defined. A complete property right is thus a right whose bundled uses are clearly defined, known and contractible. In a complete property right, every use carries out a correspondent entitlement which is clearly protected against non-owners' interference. This means that a complete property rights induces also a complete bundle of duties for non-owners: for every defined use embedded in the owner's property right, non-owners have the duty not to interfere. In our view this means that, in a world of complete property rights, there are
no interferences among owners and non-owners, but eventually only Coasean exchanges of well-defined property rights.

The above argument implies that in a world of complete rights there are zero externalities, since the correlation between rights and duties harvests at start every potential interference among owners and non-owners. The only possibility for such an interference to go off is to imagine a situation in which some uses bundled in the neighbouring property rights of Mr. A and Mr. B are not well-defined in the first instance so that both Mr. A and Mr. B exercise a rival claim over those uses with the expectation of inducing a corresponding duty to non-owners. The rival claim over an undefined use results in a sort of reciprocal veto between the claimants over the full exercise of their reciprocal claims over that use.

In terms of Hohfeld’s classification we may say that when rights are not well-defined, also correspondent duties are equally not defined and thus rival claimant will both exercise a conflicting privilege or liberty. For an externality to grow we have thus to imagine a world of incomplete rights and some joint claim over undefined uses bundled in neighbouring property rights. There is an inverse relationship, we may say, between the degree of completeness of property rights and the emergence of externalities.

This is a re-formulation of Demsetz’s (1967) original theory on the emergence and on the evolution of property rights. According to Demsetz, property rights do emerge as an efficient legal response to externalities: *What converts a harmful or beneficial effect into an externality is that the cost of bringing the effect to bear on the decisions of one or more of the interacting persons is too high to make it worth-while* (Demsetz, 1967 p. 348). The creation of a property right over an externality reduces the costs of inducing interacting agents to create a market for beneficial or harmful effects. In Demsetz’s view the emergence of new property rights takes place in response to the desires of the interacting persons for adjustments to new benefit-cost possibilities. The main intuition provided by Demsetz is that externalities induce the emergence of property rights and for a given legal system new externalities (generated for instance by technological change) induce new rights either a change (but not necessarily an exchange) in existing rights: *property rights develop to internalize
Internalizing such effects requires a process, usually a change in property rights. The important thing to be stressed here is that traditional law and economics literature on property rights usually treats property and externality as two distinct questions. Property rights are generally intended as complete bundle of defined uses, while externalities are mainly represented as nuisance problems coming from social interaction or interdependence in specific cases. Cooter and Ulen (1988) defines externalities as the (particular) problem of non-separability of individual property rights rather than as the question of incompleteness of property rights. As a consequence they confine the emergence of externality or nuisance problem to specific or sectoral cases or phenomena (as polluting activities) rather than representing them as a pervasive feature of property rights in a world of incomplete rights. A similar approach is followed by Kaplow and Shavell (1996), cited above, who distinguish between taking of things and harmful externalities. The complex relationship between incomplete property rights and externalities is in our view at the core of the distinction between property rules and liability rules as complementary tools of legal protection.

One of the main ambiguities surrounding the relationship between property rights and externalities relies on the Stigler’s version of the Coase Theorem (Coase, R. H. 1988). In its simplest form, the theorem suggests that any externality could be solved efficiently by agreed upon rights’ exchange, regardless of any original allocation of those rights, when rights are well-defined and transaction costs are negligible. As Cooter (1987) has outlined the above formulation could be easily depicted as a tautology since if rights are well-defined and complete they involve a bundle of defined uses which in turn induce a specular bundle of defined duties to non-owners not to interfere. In a world of complete rights any interference would not be an externality, rather it would be an illegitimate taking or a sort of theft. This means that the exchange of well-defined property rights in the Coasean framework is not aimed at solving an externality: it is finalized at improving efficiency with respect to original assignments of property rights, unless we would accept
the idea that any time we have a potential for a Pareto improvement in a market, the status quo is given by an externality configuration.

While we can admit, according to Buchanan and Stubblebine (1962), that the process of absorption of a Pareto relevant externality is always a Pareto improvement, we certainly cannot say that any time we have a Pareto relevant exchange we are solving a pre-existent externality. Some confusion between these two distinct situations would induce another dangerous confusion between externalities and transaction costs. Some potential Pareto improvements could be inhibited in the market by relevant transaction costs but the resulting status quo is not an externality. If Mr. A values the assets owned by Mr. B more than B does but transaction costs reduce the expected benefits of Mr. A to a point that Mr. A gives up, the missed Pareto relevant exchange is certainly not an externality. At the same time, if A takes without consent the assets from Mr. B, the negative effect for Mr. B is not an externality: it is the direct negative effect of a theft. On the other side, if Mr. A’s use of the river in his land, which trespasses also Mr. B’s property, is inhibiting a rival use of the river by Mr. B and if those rival uses were not clearly defined in Mr. A’s either in Mr. B’s bundle of property rights, an externality either a reciprocal interference between A and B will occur.

In a world of complete rights, there are no indirect effects of human actions which do not pass through market exchange of well-defined, contractible rights. According to Coase (1960), in this ‘complete’ world we can still have inertia due to the existence of transaction costs, but this inertia is not an externality. An externality is thus defined as joint claim over a rival use of an undefined entitlement.

In Demsetz’s view it is a ‘change’ in existing property rights, rather than the ‘exchange’ of existing property rights which constitutes the process of internalizing Pareto relevant externalities. We can thus distinguishing ex-ante transaction costs as the cost to be sustained to define or rather to re-define property rights as bundle of complete uses and ex-post transaction costs as the costs to be sustained to carry out a market transaction over well-defined complete bundle of uses. In our view it should be clear that the
emergence either the persistence of externalities have to do with ex-ante transaction costs.

What the Coasean approach may suggest is that when there is a Pareto-relevant externality, if ex-ante transaction costs are low, parties may bargaining over the rival uses so as to define and assign the conflicting use to the party who values it the most. While private bargaining includes two functions (definition and assignment of a right over a use), legal intervention performs just one function (definition of a new right over a previously undefined use) and leaves the process of efficient assignment to decentralized market allocation. Moreover, while private bargaining defines an entitlement over a use only with respect to contracting parties, legal intervention operates a definition of rights erga omnes.

Once we have clearly outlined the relationship between the incompleteness of rights and the emergence of externalities, we can better understand the way in which the contribution by Calabresi and Melamed could be intended as being complementary to the Coasean approach.

Calabresi and Melamed add to the Coasean framework the idea that, beside privately stipulated agreements among interested parties, the process of definition of new rights over previously undefined rival uses could be carried out by the legal intervention of the judge. When an externality occurs, the judge has to define a right over a use which has been revealed by parties’ conflict as being not well-defined in the first instance. Let first suppose that right was a well-defined right. This means that the right was correlated to a well-defined duty not to interfere by non-owner. In this case the judge has not to solve an externality neither to decide over a dispute. He has simply to sanction non-owner for having not respected her obligation not to interfere against owners. As a consequence when rights are well-defined there are no externalities and illegitimate claims are sanctioned by what is defined as property rule protection, based on injunctions and sanctions. On the opposite side when an externality occurs a decision over a definition of a new right over rival uses need to be taken.
Let us assume that Mr. A and Mr. B are the owners of two adjacent fields and that both exercise a rival claim over the use of the common river trespassing the two properties with the expectation of inducing a corresponding duty to the neighbour (say A claims to use the river for irrigation purposes while B, the upstream owner, claims to use the river as recipient for polluting activity).

Let us further assume that parties fail to reach an agreement over the use (x) and that invoke court's intervention to solve the dispute over (x).

In particular, following Calabresi and Melamed, the judge may:

- define a right for the specific use (x) and include that use in the bundle of Mr. A (this implies defining a duty of B not to interfere);
- define a right for the specific use (x) and include that use in the bundle of Mr. B (this implies defining a duty of A not to interfere);
- define a right for the specific use (x) and include that use in the bundle of Mr. A subject to the right of B to access to that specific use at a price equal to A's opportunity costs to avoided use (this implies defining a duty of B not to interfere with A's right and a duty over A not to interfere with B's right);
- define a right for the specific use (x) and include that use in the bundle of Mr. B subject to the right of A to access to that specific use at price equal to B's opportunity costs to avoided use (this implies defining a duty of A not to interfere with B's right and a duty over B not to interfere with A's right).

What the Court does in cases (a)-(d) is:

- to define a new right for the specific use (x)
- and to simultaneously re-define in a narrower sense the original bundle of rights owned by A and B.

The table below shows how the process of definition of previously undefined rights may invoke a property either a liability rule.
<table>
<thead>
<tr>
<th>Right to access to x at a given price</th>
<th>Property right over x</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>A</td>
<td>Property rule in favour of A</td>
</tr>
<tr>
<td>B</td>
<td>Liability rule in favour of B</td>
</tr>
</tbody>
</table>

The table above constitutes only a stylized case to describe possible ways of defining new rights over undefined uses, but several others have been pointed out (not only inalienability rules, but also ‘put options’ as defined by Ayres (1998)).

It is worth noting that the process of defining new rights may be done via either property or liability rule and in the next session we outline some possible criteria followed by the Courts in deciding the rule to be applied and the evolutionary complementarity which could be generated among the two rules.

From the above discussion, several conclusions need to be pointed out:

First, it should be clearly distinguished the case in which the Court settles an externality dispute by defining a new right, from the case in which there is a mere infringement of a clear defined right (and thus a violation of a duty non to interfere). A property rule could be applied to both cases but the surrounding meaning is rather different: in later case it performs the full protection of a well-defined property right, in the former one it implements a way of defining a new right over undefined uses. When rights are well-defined the property rule performs exclusively its ex-post function of protection against non consensual taking, when uses are undefined the property rule constitutes an indirect way to define a new property right. When rights are incomplete, either when the conflict

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28 In the table above, the case of a put option could be represented as the owner’s right to force the injurer’s sell of her right to access.
regards undefined uses (and undefined duties), Court always redefine the original bundle of rights.

*Second*, from the perspective of Courts’ rights definition choices, property rules and liability rules are not dissimilar: they both are tools for defining new rights and they both have distributional consequences on parties’ ex-post bargaining power over the new right market exchange. Property rule and liability rule define alternative default points in the bargaining area generated by Court’s right definition ((Ayres, Ian and Eric Talley 1995b and Aghion, Dewatripont and Rey, 1994). This means that in the process of defining new rights, the Court may apply, among others, property either liability rules according to efficiency either justice reasons or society distributional preferences, as emphasized by Calabresi and Malamed. When efficiency considerations are taken into account, the choice between property either liability depends on Court’s assessment of parties’ future bargaining power generated by Court’s rights definition.

*Third*, in our setting, the traditional theoretical distinction as well as the court's choice between property rules and liability rules is not based upon assessing monitoring transaction costs(C&M), evaluation of asymmetric information (Ayres, Ian and Eric Talley 1995b;Brooks, Richard R. W. 2002b;Kaplow, Louis and Steven Shavell 1996), or the degree of tangibility of assets (Kaplow, Louis and Steven Shavell 1996). It depends on the degree of completeness of property rights and on Court’s attitude towards the impact on parties’ ex-post contractual power of new right redefinition.

*Fourth*, property rules and liability rules, being alternative instruments of defining new rights over undefined uses, co-evolve in a complementary way: the assignment of property rule either of a liability rule induces the creation of a new property right and thus of a new duty upon non-owners not to interfere. This means that the new property right created by a Court’s decision over an undefined use (regardless of having been created through a property either a liability rule) is always protected by a property rule (non owner must not interfere), but it is nonetheless exposed to potential externalities which might eventually raise with respect to the undefined uses bundled in the new property right. These externalities could in turn be solved again by a new Court decision
implementing a property either a liability rule, and so on. The consequence of the above argument is that in some cases a property rule may generate a liability rule and in some other a liability rule can generate a property rule, showing a relationship of evolutionary complementarity among the two. The next session will analyze this last result.
IV. Understanding the evolutionary complementarity between property rules and liability rules

Once we have clear in mind that property and liability rules are not only, as Calabresi and Melamed pointed out, alternative ways to protect property rights but also, and more appropriately, two possible tools for a Court defining new rights over undefined rival uses, we may investigate the peculiar relationship existing between the two rules.

Before that, there are two main objections against our argument that it is necessary to clarify.

First, if property rights are inherently incomplete bundles of uses why do we ever observe property rules rather than having only liability rules?

Our answer is that the idea that property rights are an incomplete bundle of uses does not mean that the whole bundle contains only undefined uses. Some of these uses are well-defined and are actually at the core of the property right. They constitute standardized rights and generate corresponding duties commonly known and traditionally enforced by the legal system. For those uses there is generally the presumption that they constitute the heart of the right and ambiguity or uncertainty over the content of these uses could not be advanced by infringers as a partial relief.

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29 Looking at property as a bundle of rights has been one of most important steps towards understanding the functioning of this economic institution. The idea was so much successful that had lead to some abuses of it, in the sense that some scholars have lost sight of some of the inherently characteristics of property, and of how it is deployed in under both common and civil legal systems, that are not fully captured by the metaphor of the bundle. Before Demsetz (1967), the metaphor of rights as a bundle of uses has emerged among legal scholars in the 20s-30s. It meant that property could be reduced to a recognisable collection of functionalist attributes such as the right to exclude, transfer, inherit, use etc Merrill, Thomas W. and Henry E. Smith. 2001. "What Happened to Property in Law and Economics?" Yale Law Journal, 111:2, pp. 357-98.
As Merrill and Smith (2001) have outlined, property rights are always perceived as having a clear and well-known standard meaning. In this respect, the old-fashioned distinction between *in rem* rights and *in personam* rights seems to keep on holding. *In rem* rights are the rights, privileges duties and so forth (Hohfeld, 1917) that reside in a person, insofar as they have a certain relationship to same thing, and avail against persons constituting a very large and indefinite class of people: in other words they are valid *erga omnes*. Conversely *in personam* rights are unique rights that reside in a person and are enforceable against one or few definite persons. Without this distinction is indeed impossible to explain what Merrill & Smith (2001) call the *mystery of the numeros clauses* by which, under both civil and common law, the forms property can take are only few. In other words there is only a closed number of "property rights" courts are willing to recognise and protect. Moreover, when confronted with the challenge of creating new forms of property, intended as novel bundling of rights, courts tend to discourage these attempts and drive the parties back to the already existing pigeonholes. This back-to-the-standard exercise is in sharp contrast with the high degree of customisation allowed in other areas of law such as contract law. Why is it so? Coming back to the *in rem* nature of property we realise that if the property interests must be defended against the world, than a vast class of duty-holders must know what constrains on their behaviour such rights impose. As a consequence, the standard core of a property right makes the distinguishing characteristics of ownership intelligible by all the duty holders around and always call for property rule application. All other uses which go beyond that core are poorly defined and potentially exposed to a rival claim and thus to the generation of a reciprocal externality. Property rules and liability rules as the Court’s instruments to define new property rights could be eventually applied to those undefined uses. That is why in a world of incomplete rights we observe both property and liability rules.

Second, if both property rules and liability rules are alternative ways for a Court to define new property rights and correlated duties, in turn protected by a property rule, why don’t we observe an evolutionary tendency towards the progressive dominance of property rules?
Our answer here is that incompleteness of rights is pervasive in the sense that notwithstanding the ex-post role played by Courts (and regulation) in completing rights over time, there is always a positive degree of incompleteness i.e. the potential for some uses to be poorly defined and to raise externalities. Changes in technology, preferences, information, knowledge, wealth may affect the nature and the extent of undefined uses in a bundle of rights so that externalities might always be regenerated. As Demsetz (1967) pointed out, “changes in knowledge result in changes in production functions, market values, and aspirations. New techniques, new ways of doing the same things, and doing new things – all invoke harmful and beneficial effects to which society has not been accustomed”. Therefore, “given a community’s tastes in this regard, the emergence of new private or state owned property rights will be in response to changes in technology and relative prices” according to “a principle that associates property rights changes with the emergence of new and revaluation of old harmful and beneficial effects” (p. 350).

The above quotations clearly show the dynamic and evolutionary complementarity between property rules and liability rules. These rules are implemented by Courts as alternative ways to define new property rights. In turn, these newly created rights are protected by a property rule until a new externality over undefined uses bundled in those rights does emerge. At that point Courts might be called for a decision which may involve again property either liability rule. We can thus have alternative evolutionary paths which can increase either decrease the dominance of property or liability rules, altering each time the balance between the two, according to the frequency of externalities, Courts’ attitudes, and the evolution of legal and economic systems.

V Conclusions

Throughout the vast literature that followed the original cathedral, the role of Coase's work on the problem of social costs is widely recognised as been key to C&M grand building. Coase was indeed interested in looking at the efficiency role played by market exchange in rights allocation when property rights are well-defined, regardless of initial assignment of the same. C&M tried to break through Coase's departing point and
explored the way property rights are first allocated and than protected. Indeed they assumed perfect definition and specification of all uses bundled in a property right. With the present paper we have tried to look beyond the texture, which the original C&M’s cathedral is painted upon. We have contended the idea that the bundle of uses property rights are made of are well-defined in the first instance. We have argued that talking of externalities in a world of well-defined rights has no relevance. When property rights are well-defined any claim against owners is *per se* inhibited in quite almost legal systems. Thus, we have concluded that the only reason why externalities and dispute over private property rights do emerge is because property rights are a bundle of both specified and unspecified uses. While the first ones are always protected by rights to which the jural opposite of a duty correspond, the seconds, being unspecified uses, are the domain of privileges and no-rights in Hohfeldian tradition. Unspecified uses may lead to conflicts before courts when private bargaining fail to reach Pareto outcomes.

We have thus proposed to make a step back with respect to Coase and Calabresi and Malamed. Thus beside allocation of rights and choice of protection rule there is the issue of the degree of completeness of property rights or rights definition.

We have now set the stage for reconsidering C&M findings in another light. Property rules and liability rules are not opposed instruments of defending property rights; rather they are two alternative ways the court can take to redefining the rights. This result has several consequences in terms of the evolutionary complementarity between property rules and liability rules. Also, it provides a framework which allows us to unify C&M with K&S approach and provide insights consistent with them.

With respect to C&M approach, the choice between property rule and liability rules is still consistent in our framework with the dimension of transaction costs. But these are, in our case, the costs associate with the ex-ante definition of property rights rather than the ex-post cost of protection. At the same time, our proposal is consistent with K&S distinct ion between ‘taking of (tangible) things’ (which in our case are simply well-defined uses in a property bundle) and ‘harmful externalities’ or ‘taking of intangible
things’ (which in our setting represent the case in which there is a rival claim over undefined uses).

The last section of the article has finally pointed out that he debate over the dominance of a rule over another is simply misplaced: since incompleteness is a pervasive feature of every bundle of property rights, both property rules and liability rules co-evolve over time as a result of a complex dynamics which involves changes in technology, preferences, information, knowledge, wealth and institutional setting. After all, in Monet’s paints it was sufficient a slight change in sunshine light to have another cathedral, and another, and another.
VI References


