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Coasian and modern property rights economics

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Abstract: Laying the foundations of property rights economics stands out among Ronald Coase's many seminal contributions. This approach had an impact on a number of fields in economics in, particularly, the 1960s and 1970s. The modern body of property rights economics mainly originates in the work Oliver Hart and is quite different in style, scope, and implications from the original property rights economics of Coase, Demsetz, Alchian, Cheung, Umbeck, Barzel, etc. Based on our earlier work on the subject (Foss and Foss, 2001), we argue that the change from Mark I to Mark II property rights economics led to a substantial narrowing of the scope of property rights economics, somewhat akin to a Kuhnian loss of content. In particular, Mark II property rights economics make strong assumptions concerning the definition and enforcement of ownership rights made which lead to many real life institutions and governance arrangements being excluded from consideration, and a much more narrow focus than that of the rich institutional research program initiated by Coase and his followers.

1. Introduction

The 1991 Nobel Prize in economics was conferred upon Ronald H. Coase for his 'discovery and clarification of the significance of transaction costs and property rights for the institutional structure and functioning of the economy'.[1] To be sure, notions of property rights were sometimes mentioned in the economics literature prior to Coase's 1960 paper, 'The Problem of Social Costs'. Thus, perceptive economists hinted that property rights come in different form and this may influence outcomes. Important, early examples are Knight's (1924) property rights-based critique of Pigou's analysis of how taxation may address road congestion problems; Mises' (1936) critique of how socialist economists neglected the incentive problems that accompany the property rights arrangements of socialist economies; Berle and Means' (1932)

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1 http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1991/coase-facts.html

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notion of the separation of ownership and control in US business; or Alchian's (1958) analysis of the economics of the university. However, it was Coase's 1960 paper (anticipated, of course, by Coase, 1959) that established the property right as a distinct and important unit of analysis in economics, and outlined a program for understanding the economic role of organizations and institutions based on property rights insights. These new insights are based on a fine-grained, yet expanded understanding of the constraints that agents face, rooted in the idea that property rights can be held, defined, exchanged, and enforced across the multiple attributes (uses, functionalities) of assets (Barzel, 1997; Coase, 1960).

The introduction of property rights in Coase (1960) was, of course, accompanied by an emphasis on transaction costs as determinants of how well property rights are delineated and enforced. Earlier contributions to economics, such as Pigovian welfare economics (Coase, 1960) or monopoly theory (Demsetz, 1964), was criticized for making unwarranted, implicit assumptions about transaction costs, notably that were either entirely absent (e.g. the model of perfect competition) or infinite (e.g. Pigovian welfare economics which assumes that welfare-increasing trades are not possible between those who cause externalities and those who suffer them; Coase, 1960).[2] Such assumptions make it difficult to understand how real world agents create institutions and otherwise solve problems related to the allocation and enforcement of property rights. These ideas spawned a literature on property rights economics (henceforth, 'PRE') that spanned across economic history (Alchian and Demsetz, 1973; North, 1990), industrial organization (e.g., Alchian and Demsetz, 1972; Alessi, 1983), contract economics (Cheung, 1969, 1970), resource and agricultural economics (Allen and Lueck, 1998; Anderson and Hill, 1990; Libecap, 1989; Schlager and Ostrom, 1992, law and economics (e.g., Calabresi and Melamed, 1972; Lueck, 1995), and comparative systems (Furubotn and Pejovich, 1972).

Much of the early property rights literature focused on identifying differences in outcomes (i.e. allocative efficiency) of alternative systems of property rights. This literature also addressed the emergence and transformation of property rights (Demsetz, 1967), the connectedness of property rights in systems (Alchian, 1965), and their connections to law, norms, and customs (Demsetz, 1964). Toward the end of the 1960s, it would be warranted to think of the 'economics of property rights' as a clearly successful approach. Thus, in a 1972 review article Furubotn and Pejovich (1972: 1156) declared that 'property rights analysis does offer a fresh and useful way of looking at economic problems. Substantial advances have already been achieved and the literature gives evidence of continuing vitality and promise of future accomplishment'.

2 Pagano (2000) argues that Mark II PRE works with a 'Swiss cheese assumption': Holes of infinite transaction costs are carved in an otherwise smooth surface of zero transaction costs.

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In hindsight, one may question whether Furubotn and Pejovich were right—in particular with respect to whether the approach exhibited 'continuing vitality' and 'accomplishment'. On the one hand, influential economists, like Armen Alchian, Yoram Barzel, Stephen Cheung, Harold Demsetz, Eirik Furubotn, and John Umbeck, were directly associated with PRE, and Nobel Prize-winning economists Douglass North and Elinor Ostrom were active users of PRE their applied work. On the other hand, however, few economists today define themselves as working in the tradition of the PRE of the 1960s[3]—a tradition that we here call 'Mark I PRE'. However, this is not to say that notions of property rights are unimportant in contemporary economics. In fact, the arguably dominant contemporary approach to the economics of the firm is often called 'property rights theory' (Grossman and Hart, 1986; Hart and Moore, 1990; Segal and Whinston, 2012), what we call 'Mark II PRE'. However, contributors to the Mark II research stream provide at best sparse reference to the older property rights literature. For example, a recent authoritative chapter on 'property rights' (Segal and Whinston, 2012) published in the prestigious *Handbook of Organizational Economics* (Gibbons and Roberts, 2012) only mentions Coase (1960) and Demsetz (1967) in passing, and then concentrate all the attention on the modern, Mark II approach, associated in particular with the work of Oliver Hart (Grossman and Hart, 1986; Hart and Moore, 1990). In the modern literature, key contributors to the Mark I PRE, like Alchian and Demsetz, are typically cited for their contributions to the economics of the firm (Alchian and Demsetz, 1972; Klein *et al.* 1978) rather than for their contributions to 'pure' PRE.

This lack of attention to older work on property rights may seem puzzling. The puzzle vanishes, however, when it is realized that the economics of property rights Mark I was only one among many other advances in a decade, namely, the 1960s, that was extraordinarily rich in theoretical innovation in economics. Modern PRE finds its origins in some of these other advances rather than in Mark I PRE. Moreover, Mark I property rights theorists largely worked in the nonmathematical mode of theorizing sometimes referred to as 'UCLA-Chicago price theory' (e.g. Green, 1986). In contrast many of the other advances of the 1960s, such as the economics of uncertainty and information, human capital theory, and the first stabs at what would later be called 'agency theory' and 'mechanism design', were made within the confines of the general equilibrium theory that dominated pure theory. Mark II PRE is directly placed within this tradition, as filtered through the game theoretical revolution of the 1980s. This helps explain the fact that Mark I property rights theorists are seldom cited in modern research on property rights of the Mark II variety; the 'style' of doing research is arguably too different. More broadly, it may explain why

3 Examples of currently active Mark I scholars include Douglas Allen, Lee Alston, Thrainn Eggertson, Gary Libecap, and Dean Lueck.

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the dominant analytical lens on property rights shifted from the Mark I to the Mark II approach, because the increasing emphasis on formalization meant that earlier insights expressed in a purely mode were either subsumed under a formal approach or banished from economics.

Thus, more is at stake here than whether the earlier economists who contributed the founding, seminal insights get the credit they are due. To be sure, much of Mark I PRE analysis has been absorbed in the economic mainstream (e.g. the basic idea that externality problems are caused by ill-defined and/or costly-to-trade property rights). But not all that was important has been absorbed, and modern PRE is considerably narrower than the approach pioneered by Coase. In fact, we argue that the change from Mark I to Mark II PRE has some of the features of a Kuhnian 'loss of content' of paradigmatic change (Kuhn, 1996). We do not want to press the claim that we are, in fact, talking about a genuine Kuhnian loss of content, first, because PRE hardly qualifies as a paradigm in the sense of Kuhn, and, second, because Mark I PRE, while superseded by Mark II PRE, is still in use among practicing economists. For example, it is used by agricultural and resource economists and economic historians (e.g., Allen and Lueck, 1998; Anderson and Hill, 1990). However, the loss of content terminology is fitting for a number of reasons.

First, PRE Mark II represents a substantially narrower approach in terms of the phenomena it investigates, namely why it matters who owns the asset(s) in a relation that spans at least two stages of production in a value chain. The analysis is typically, if not exclusively, cast in the context of vertical firm boundaries (Grossman and Hart, 1986; Hart and Moore, 1990) and internal organization (e.g., Rajan and Zingales, 1998). Second, and more importantly Mark II PRE deals predominantly with *ownership* rather than with the analytically different (and arguably broader) category of property rights. In Mark II PRE, ownership is seen as conferred by holding legal title to an asset, and gives owner 'residual rights of control', that is, rights to make decisions in situations that are not covered by contract. This implies that the scope of the analysis becomes more narrow.[4] Third, in Mark II PRE ownership is seen as unambiguous and is assumed to be indivisible, perfectly defined and enforced. These assumptions make it unnecessary to inquire into the legal and other institutions that support asset ownership. In contrast, Mark I PRE stress that effective ownership is dependent on private and legal enforcement of claims to ownership, establishing a broader link to institutions (Hansman, 1996; Sened, 1997). In the following we substantiate these arguments.

4 Consider the Coase theorem. Focusing solely on asset ownership allows only for one market solution to externalities, namely a redistribution of ownership (integration). In contrast, the Mark I PRE allows for a much more nuanced analysis, as assets are perceived of as bundles of property rights that may be held by different individuals as well as constrained in various ways. (Alchian, 1965; Barzel, 1997; Coase, 1960).

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2. The development of property rights economics

Mark I property rights economics: overall characteristics

Overviews of Mark I PRE (e.g. Alessi, 1990; Eggertson, 1990; Furubotn and Pejovich, 1972) typically portray the approach as a rather straightforward extension of basic price theory, or applied neoclassical economics. Specifically, PRE Mark I is characterized by the key heuristics that (1) the utility maximization hypothesis should be applied to literally all choices (Alchian, 1958, 1965; Barzel, 1997); (2) all of the constraints implied by the prevailing structure of property rights and transaction costs must be taken into account (e.g. Demsetz, 1964; and (3) the contractual, organizational, and institutional implications of (1) and (2) must be identified and explained (Alessi, 1990). To put it in a compact manner, PRE is about the explanatory consequences of an expanded and refined understanding of individuals' opportunity sets relative to standard price theory (Umbeck, 1981). Property rights may be seen as the explanatory vehicle that is deployed to unfold this view (Barzel, 1997).

The older property rights literature typically defines property rights as the rights to exercise choices over productive resources and to keep the income derived from their use (Alchian, 1965).[5] In other words, at the heart of the (economic) notion of property right is effective *control* (Barzel, 1997). Transaction costs, in this conception, are not simply the 'frictions' associated with trading—finding trading partners, writing contracts, hiring lawyers—, but are more generally the resources spent on delineating, protecting, and capturing *de facto* property rights (Barzel, 1994, 1997; Eggertson, 1990), whether these rights are being traded or not.[6]

Coase (1960)

PRE was founded with the explicit introduction of a new unit of analysis—namely, the property right—in a relatively specific context, namely the analysis of externalities in Coase (1960). The three characteristics of Mark I PRE mentioned above unfolded only gradually over the following two decades, building from Coase's (1960) breakthrough. For example, the full implications of what trade can accomplish under the zero transaction costs assumption [e.g. monopolies do not influence resource allocation (Demsetz, 1964), all institutional alternatives

5 Legal scholars distinguish between 'property' and 'possession'. The early property rights economists typically side-stepped this distinction. This has led to the arguably confusing use of the notion of 'property right' for what is essentially 'effective control', which, however, may not, properly speaking be a 'right' (e.g. a criminal can exercise effective control over assets, even if this control is not socially sanctioned). We discuss this later.

6 Allen (1991) usefully distinguishes between a narrow, trade-based notion of transaction costs, which he calls the 'neoclassical approach', and a broader, property-rights view. In the neoclassical view, transaction costs are analogous to search costs or transportation costs, and can be analyzed as any other cost of doing business.

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are efficient (Cheung, 1969), market structure is indeterminate (Furubotn, 1999), etc.] emerged as a result of critical reflection on the analytical benchmark in Coase (1960). While that benchmark has attracted massive attention, Coase himself toned down the importance of the 'Coase theorem'. What matters, Coase has repeatedly stated, is exploring the many legal, contractual, and institutional ramifications of transaction costs (Coase, 1988). As late as in 1992, Coase argued that this research program was still in its infancy (Coase, 1992).

The property right: a new unit of analysis

The arguably central analytical innovation of Coase (1960) is the introduction of a new unit of analysis, namely the property right, and the 'corollary' notion of exchange as involving the more or less costly exchange of more or less well-defined property rights. The specific context for the introduction of property rights as a new analytical unit is a discussion of the economic implications of different allocations of legally delineated rights (liability rights) to a subset of the total uses of an asset, namely those that have external effects on the value of other agents' abilities to exercise their use rights over assets. In his critique of the Pigovian approach in welfare economics, Coase (1960: 155) notes that a reason for the failure of this approach to come fully to grips with externality issues lies in its 'faulty concept of a factor of production' which is 'usually thought of as a physical entity which the business-man acquires and uses'. According to Coase (1960: 144), it is often more productive to think of a production factor, not as a physical entity but as a right to perform certain actions: 'We may speak of a person owing land and using it as a factor of production but what the land-owner in fact possesses is the right to carry out a circumscribed list of actions'. Coase explicitly motivates the introduction of property rights as a new analytical unit by stating that 'it becomes easier to understand that the right to do something which has a harmful effect (such as the creation of smoke, noise, smells, etc.) is also a factor of production' (ibid.).

An important difference between assets (understood as factors of production) and property rights is that the property rights notion allows for a more nuanced analysis of the link between asset uses and the creation of value under different social settings and legal and other social institutions. Thus, the value that an asset can produce in a particular use does not only depend on its quality, but also one the restrictions facing the owner in that particular use or setting in which it is deployed.

Coase (1960: 145) explicitly discusses this in connection with land as a factor of production. He points out that the

> rights of a land-owner are not unlimited. It is not even always possible for him to remove the land to another place. For instance, by carrying it. And although it may be possible for him to exclude some people from using 'his' land, this may not be true of others. For example, some people may have the right to cross the land. Furthermore, it may or may not be possible to erect certain types

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of buildings or to grow certain crops or to use particular drainage systems on the land. This does not come about simply because of Government regulation. It would be equally true under the common law. In fact it would be true under any system of law. A system in which the rights of individuals were unlimited would be one in which there were no rights to acquire.

The evolution of Mark I property rights economics since Coase (1960)

The understanding of property rights evolved within Mark I PRE since Coase (1960). For example, Demsetz (1964) and Alchian (1965) went beyond Coase's focus on use rights, defining property rights as individuals' rights to use, derive income from, and alienating assets, a definition corresponding to the partition in Roman law between *usus, fructus,* and *abusus,* respectively. The relation to property law was also debated.[7] It became an increasingly commonly held view that property rights can be meaningfully analyzed separately from legal considerations (some scholars therefore talk about 'economic rights', e.g. Barzel, 1997). In fact, some scholars argued that property rights may exist in the absence of the state, that is, under wholly anarchic conditions (Bush and Mayer, 1974; Umbeck, 1981). Physical force or strong social norms may guarantee *de facto* control over the uses of and income from a resource. Finally, Mark I property rights theorists argued that from an economic perspective property rights can be understood in value terms and that agents seek to maximize the value of the control they hold over assets.

In line with such ideas, Alchian and Allen (1969: 158) offered a highly compact definition of property rights as 'the expectations a person has that his decision about the uses of certain resources will be effective' (see also Cheung, 1970). This understanding places all of the emphasis on effective control and completely deemphasizes any legal connotations of the property rights construct.[8] In a more recent statement, Barzel (1994: 394; emphasis in original) defines property rights as

> an individual's net valuation, in expected terms, of the ability to directly consume the services of the asset, or to consume it indirectly through exchange. A key word is *ability*: The definition is concerned not with what people are legally entitled to do but with what they believe they can do.

Property rights in such definitions refer to an individual's expected opportunity set, that is, to the multiple margins on which economizing may take place. Moreover, in contrast to, for example, the stress on property rights as socially

7 It is, however, questionable how much these discussions were informed legal theory. As an illustration legal scholar Honorè (1961) identified no less than eleven different types of property rights, a number of which are not captured by the types identified by PRE scholars.

8 This may be contrasted with Honorè's (1961: 115) position that to 'have worked out the notion of "having a right to" as distinct from merely "having" ... was a major intellectual achievement. Without it society would be impossible'.

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sanctioned relations between individuals in Demsetz (1967), property rights in these definitions imply that even Robinson Crusoe will hold property rights. Thus, Demsetz (1967: 347) explicitly argues that

> [i]n the world of Robinson Crusoe property rights play no role. Property rights are an instrument of society and derive their significance from the fact that they help a man form those expectations which he can reasonably hold in his dealings with others. These expectations find expression in the laws, customs, and mores of a society. An owner of property rights possesses the consent of fellowmen to allow him to act in particular ways. An owner expects the community to prevent others from interfering with his actions, provided that these actions are not prohibited in the specifications of his rights.

However, other scholars, notably as Alchian, Cheung and Barzel, effectively divorced the definition of a property right from legal considerations. Thus, in this understand, a thief holds property rights to the asset he stole to the extent that he effectively controls it, (Barzel, 1997; Hodgson, 2013). Still, although these scholars maintain the meaningfulness of talking about property rights even in the complete absence of law, they do recognize that in actuality such rights have a legal dimension, and in particular that the value of property rights is influenced by legal sanction and enforcement (Barzel, 1997).

Ownership in Mark I property rights economics

The introduction of property rights as analytical category created a novel understanding of the link between assets, value creation, and the legal and other social institutions that underpin property rights. However, while the introduction of property rights made it possible to understand many more types of transactions than those involving the exchange of assets (or factors of production), it also implied a less clear cut understanding of what it means to own an asset.

Mark I PRE typically describes assets in terms of bundles of attributes (uses of the assets) to which property rights can be held. In this scheme, asset ownership can be described as the possessing the 'right to carry out a circumscribed list of actions' (1960: 144).[9] The vector of rights is circumscribed partly by legal or governmental restrictions, and, as stressed in the works of particularly Umbeck (1981) and Barzel (1997), partly by the ability of the holder to exclude others from the specific uses defined by the rights. Thus, in a Coasian view ownership does not provide the owner with unlimited rights to assets, only to certain uses of the asset. In the zero transaction cost setting underlying the Coase Theorem, all possible uses (including future ones) of assets are known and can be contracted for (Barzel, 1997; Furubotn, 1991), such that it will be fully clear to an owner of an asset what actions can be carried out and at what costs. In fact, it is *only* in

9 Much subsequent work within property rights economics has refined this insight, applying it to issues like public ownership and the public corporation. Barzel's (1997) work in particular has been taken up with examining the behavioral and allocative consequences of the multi-attribute nature of most assets.

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the setting underlying the Coase Theorem that an actor has a well-defined and absolute list of the set of actions that follow from the ownership of that asset.

Since the zero transaction cost setting is an unrealistic benchmark, ownership *per se* is not what is of primary interest in Coase (1960). Indeed, a reading of that paper leaves one with the impression that ownership is something of an epiphenomenon, at best derived from the more fundamental notion of use rights (so that holding a certain minimum bundle of non-trivial use rights make one the effective owner). Mark I PRE suggests that it is possible to examine the consequences for allocative efficiency of a contractual allocation of property rights without involving the notion of ownership at all. Perhaps for this reason, ownership remained a fuzzy analytical category within Mark I PRE.

The ownership conundrum

While Mark I PRE increasingly converged on a compact definition of property rights as effective control, it did not definitively resolve a puzzle that Coase had left unaddressed: What exactly is the economic meaning and function of ownership of assets? Until the emergence of the Mark II PRE, the literature has typically defined the construct opportunistically, that is, depending on the specific explanatory purpose at hand. For example, Demsetz and Alchian both put much emphasis on the rights to exclude and alienate as the relevant criteria of private ownership in their work on systems of property rights. In this work, owners are the individuals who can exercise these rights (Alchian, 1965; Demsetz, 1967). However, interestingly these authors change their understanding of ownership when they analyze the organization of the firm and corporate governance, where owners are defined as those individuals possessing control rights (Demsetz, 1967) or residual income rights (Alchian and Demsetz, 1972). The modern corporate finance literature, which to a large extent originates in Mark I PRE (i.e., Alchian and Demsetz, 1972; Fama and Jensen, 1983; Jensen and Meckling, 1976; Manne, 1965) has tended to define ownership in terms of residual income rights. More generally, the older property rights literature left unresolved the precise role played by other types of economic rights besides the use rights stressed by Coase (1960) (e.g. rights to exclude, alienate and derive income from assets) in the function of ownership. In fact, Demsetz (1988: 19) argued that the meaning of ownership is inherently 'vague' because there is no bound on the number of attributes of an asset that can be owned, although he thinks that 'certain rights of action loom more important than others. Exclusivity and alienability are among them'. Indeed, exclusivity and alienability loom large in discussions of ownership in Mark I PRE. For example, Umbeck (1981: 39) identifies ownership with the '... abilities of individuals, or groups of individuals, to forcefully maintain exclusivity'. In actuality, such 'abilities' depend, of course, on what are recognized as legitimate claims, and therefore involve historically contingent circumstances relating to the positions of power and the ability to exercise force that define and enforce the rights of the owner (Sened, 1997).

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Why ownership matters

A possible unifying interpretation of what asset ownership is about in Mark I PRE is that it refers to list of unspecified use and thus income rights, where excludability can be enforced to different degrees, depending on the particular social arrangement and on who holds ownership. Ownership is thus fundamentally contingent, not absolute, because it is dependent on private and legal enforcement. Although ownership is never complete or absolute, it still has economic importance because it determines who can take action to exclude non-owners. Such exclusion matters, for example, because it allows prices to be used as a way of rationing the use of resources and thereby reduces commons type problems (Barzel, 1997). Ownership also matters because it determines who can alienate (sell, transfer) assets. The obvious importance of this is that alienability reduces the transaction costs of taking advantage of opportunities for wealth creation through exchange (Alchian, 1965). Ownership furthermore matters because it determines who as a default can decide on new types of uses of an asset. This matters because it reduces the transaction costs of taking advantage of hitherto undiscovered or new uses of assets. Finally, ownership determines how can decide on the use of an asset in case of unforeseen contingencies, which is of importance as it may act to increase the bargaining power of the owner in a contractual relation. This final point represents the key insight of Mark II PRE.

3. From Coasian property rights to Hartian ownership

Mark II property rights economics

Whereas the emergence of PRE Mark I may be dated to the publication of Coase (1960), the emergence of the Mark II stream can be dated to the publication of Grossman and Hart (1986), an article that has come to define how modern economists conceptualize ownership and analyze its behavioral and allocative consequences.[10] The impetus to Coase (1960) was the questioning of how to efficiently allocate use rights to assets like the radio spectrum or cornfields across multiple potential users, implying multiple potential rival uses. Mark II PRE emerged in the context of a more narrow problem: What explains the vertical boundaries of the firm; in particular, what is the role of asset ownership with respect to explaining firm boundaries? The issue of the boundaries of the firm is of course a staple of transaction cost economics, and Mark II PRE is sometimes portrayed as a formal version of Williamsonian transaction cost economics (Williamson, 1996). Although this is an incorrect characterization (cf. Kreps, 1996; Williamson, 2000), Mark II PRE does borrow one key construct from transaction cost economics, namely incomplete contracts (a construct that is not explicitly present in Mark I PRE) (Williamson, 1996). In the context of

10 Early Mark II work is summarized in Hart (1995), while Segal and Whinston (2012) also describe more recent developments.

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making sense of ownership, this is seen as a key point by Mark II property rights theorists: When contracts are incomplete, there will be some contingencies that are not regulated by the contract. The institution of private ownership of assets allocates residual use rights to assets owners allowing them to decide on how to fill the holes of the contract.[11]

However, saving on the cost of renegotiating contracts is not the main economic functioning of asset ownership in Mark II property rights theories. Rather, the economic importance of asset ownership stems from the effect that ownership of nonhuman assets has on contracting parties' incentives to invest in human assets. Investments in human assets are assumed to be nonverifiable by a third party (e.g. courts) and for that reason contracting parties cannot contract over the costs or the outcomes of such investments. Instead, bargaining determines the returns from the nonverifiable investments, so that each party gets his opportunity cost plus a share (assumed equal) of the (verifiable) profit stream. Owning the assets that are complementary to the human capital investment provides a bargaining lever in an *ex post* bargaining situation and thus influences how the surplus from the relation is split. The allocation of ownership to assets therefore influences the contracting parties' incentives to make investment in human assets. A reallocation of ownership of physical assets alters the parties' opportunity costs of noncooperation after specific investments have been made, changing the expected payoffs from the human asset investments. A reallocation of asset ownership may increase the total surplus in the relation, but this comes about at the cost of reducing one of the parties' investment incentives (excepting the situation in which the parties' marginal costs of investment are equal). This trade-off determines the efficient allocation of ownership.

Mark II PRE starts from the idea that firms are collections of assets and that joint ownership of nonhuman, alienable assets is what defines the boundaries of a firm. The role of firms becomes one of solving a particular externality problem arising from the nonverifiability of human capital: When such investments cannot be contracted over, private returns differ from social returns. Agents are sufficiently farsighted to foresee this, and, hence, their investments will be inefficient. The central issue thus becomes: Who should own the (nonhuman) asset for (second-best) efficiency to obtain?

Note that this tacitly assumes that it is possible to unambiguously identify *the* owner of an asset. Specifically, Mark II PRE does not address (alienable) assets that are in the 'public domain' (Barzel, 1997) in the sense that other individuals may spend resources on capturing them without compensating anyone (as in theft, homesteading, etc.). Thus, all alienable assets are assumed to be fully in

11 A now classic critique by Maskin and Tirole (1999) suggests, however, that this is a *non sequitur*: If contracting parties can probabilistically anticipate their future payoffs (as assumed by Mark II theorists), they can also design mechanisms that guarantee efficient contracting and investment levels (which Mark II PRE denies).

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the private domain in the sense that ownership titles are perfectly defined and perfectly enforced. Mark II PRE scholars seek to ground their understanding of asset ownership in legal thinking. Thus, Hart (1995: 30n) approvingly quotes Oliver Wendell Holmes' understanding of ownership in support of his own view: 'But what are the rights of ownership? They are substantially the same as those incidents to possession. Within the limits prescribed by policy, the owner is allowed to exercise his natural powers over the subject-matter uninterfered with, and is more or less protected in excluding other people from such interference. The owner is allowed to exclude all, and is accountable to no one'.

Solving the ownership conundrum?

In Mark II PRE a fundamental distinction obtains between specific rights of control that can be allocated by contract and residual rights of control that are allocated by ownership. Ownership is defined as the legally defined and enforced possession of an asset. Specific rights of control are delineated and directly allocated through contract, while residual rights of control are obtained through the legal ownership of assets and imply the 'right to decide usages of the asset in uncontracted-for contingencies' (Hart, 1996: 371), as well as the right to 'decide when or even whether to sell the asset' (Hart, 1995: 65).

The notion that ownership is what allocates residual rights of control would seem to be a legally grounded solution to the ownership conundrum in Mark I PRE. However, the solution comes about by means of strong simplifications (Demsetz, 1998; Foss and Foss, 2001), specifically by making the two closely related implicit assumptions that ownership is (1) well-defined and (2) perfectly enforced/noncontestable. These assumptions ease analysis because they imply that an owner of an asset has full control over the use of the assets in situations that are not covered by a contract (this simplifies the analysis of the bargaining situations), and because firm boundaries can be identified unambiguously (namely in terms of who owns which assets). However, these assumptions are also at variance with Mark I PRE.

In his review of Hart (1995), Demsetz (1998: 449; emphasis in original) points out that 'Hart writes as though he thinks that *asset* ownership is an unambiguous concept'. Mark I PRE theorists such as Demsetz generally question whether asset ownership is that 'unambiguous' or even well-defined. For example, Barzel (1997) argues it is often more fruitful to focus on the property rights to attributes of assets rather than on the ownership of assets. The reason is that most assets have so many attributes (many may be nonspecified or as yet unknown) that the notion of ownership of assets is vague. Likewise, Demsetz argues that 'full private ownership' over assets is vague, and '... must always remain so, for there is an infinity of potential rights of actions that can be owned ... It is impossible to describe the complete set of rights that are potentially ownable' (Demsetz, 1988: 19). Thus, ignorance about the full set of uses, present and

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future, of assets suggests that neither the owner nor the contracting partner can have precise expectations regarding the value of the residual control rights.[12]

In Mark II PRE, the key issue is why it matters who owns the asset. *Assuming* that ownership is unambiguous is, of course, highly convenient as it allows for an equally unambiguous identification of *the* owner of any given (owned) asset and therefore in turn allows the boundaries of the firm to be unambiguously defined. As already discussed, the logic by which ownership comes to be seen as being an unambiguous construct is, however, not entirely transparent.

The main rival in the literature to the understanding of ownership as the legally defined and enforced possession of residual control rights is the notion of ownership as the possession of residual income rights, typically associated with the corporate finance literature (e.g. Laporta *et al.* 1999). Hart (1995: 63–66) suggests that the residual income notion is '... not a very robust or interesting theoretical concept' (1995: 64). Residual income rights are not useful as a notion of ownership, since they can easily be divided which residual control rights cannot 'in the same way' (1995: 64n). Perhaps Hart means that residual rights of *control* cannot be allocated *ex ante* between parties (Foss and Foss, 2001). In contrast, residual rights to *income* can in principle be allocated *ex ante* in any way between the parties. While it is true that a given residual control right to a specific set of uses of an asset can be difficult to share between parties (Demsetz, 1998), this does not mean that residual control rights to *assets* are necessarily nonshareable between individuals. One can imagine arrangements where an individual effectively controls an asset (e.g. a taxi) on specific weekdays whereas another individual controls it on other weekdays. Hart admits that residual rights of control are in fact divisible in such a way (e.g. he talks about 'forms of intermediate ownership' that cover this; Hart, 1995: p 61). Of course, while control rights may be divisible someone has to be the 'ultimate' owner in the sense that only she can veto the use of an asset. Or, so it would seem. Consider a cooperative or a partnership. In these contractual arrangements, control is exercised by means of majority rule. In effect, any majority that may happen to form decides on what shall be done with assets in situations that are not covered by contract. Obviously, such majorities can change over time in terms of their composition. But this means that it is not possible to unambiguously link residual rights of control to any single identifiable individual, and in fact, the whole strategy of assuming that it is possible to unambiguously identify *the* owner of an asset is called into question.[13]

12 This point was suggested to us by an anonymous reviewer.

13 In the context of corporate governance research Chassagnon and Hollandts (2013) argue that the issue of who owns the firm remains a vexing one. In fact, they conclude that legal scholarship lends support to the notion that no one in particular owns the firm. Moreover, no one '... owns the firm because beyond the formal aspects of it that are recognized by law, the firm is a social organization that is institutionalized separately from the law' (Chassagnon and Hollandts, 2013: p 10). This does not mean that an economic analysis of the corporation is ruled out; on the contrary, the authors recommend placing

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A further reason why ownership may in actuality be ill-defined has to do with enforcement issues. Mark I PRE suggests that all property is potentially partly in the public domain as the definition and enforcement of property rights are never perfect in a world of positive transaction costs (Barzel, 1997; Umbeck, 1981). This gives substance to the Mark I PRE argument that there is a distinction between legal rights (what legal scholars would call 'property rights') and economic rights (i.e., effective control) (Alchian, 1965; Barzel, 1997). Legal rights to an asset may not be fully congruent with the economic rights to that asset, because the latter can only be enforced at high cost. Or, legal rights may be fully congruent with economic rights, because the costs of capturing economic rights are small but the costs of securing legal title to those rights are high. In the presence of such transaction costs, the distinction between legal and economic rights becomes meaningful with respect to potentially *any* asset, whether human capital assets or nonhuman capital assets (Barzel, 1997). Thus, while an owner may decide to use his asset in a particular use, the economic outcome of exploring this particular use right depends on his cost of enforcing exclusive use rights and income rights. In other words, externalities may not be perfectly internalized in all asset uses. For this reason, Demsetz (1998: 450) suggests that the 'generally more correct approach is to avoid speaking of asset ownership unless all rights to the asset are owned by one party'. However, such concentration of rights is an anomaly; hence, ownership is ill-defined in most real-world situations.

Does it matter?

Coase (1974) argued that economists had too often been prone to offer verdicts on what are optimal ownership or financing patterns based on highly stylized models that are insufficiently grounded in empirical reality. He famously took the treatment of the lighthouse, seemingly the quintessential public good, in the economics literature as an example. Thus, many economists had routinely taken lighthouse services as perfect examples of fully nonexcludable and nonrivalrous goods. Looking into the relevant historical records, Coase documented how in the past lighthouse services had in fact been in private supply, for example, by linking the financing of lighthouse to harbor fees. Thus, an element of excludability was added by the specific institutional arrangements that were adopted. In contrast, to simply *define* lighthouse services as pure public goods narrows the range of institutional alternatives for ownership and financing considerably.

To some extent, the treatment of asset ownership in Mark II PRE is a new lighthouse in economics. Thus, economists working within this stream have adopted a highly stylized notion of ownership that, while it seems to

'power' centrally in the analysis of firm boundaries and internal organization. Their notion of power is close to the notion of effective control highlighted by Mark I PRE as the hallmark of property rights (Barzel, 1997).

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conform to legal notions of ownership, involves the problematic assumptions that ownership is indivisible, perfectly defined, and fully enforceable. By adopting these assumptions Mark II PRE has difficulties realistically analyzing how ownership is supported by legal and other institutions. As Mark I property rights economists have pointed out, such an analysis would reveal that in actuality, asset ownership is neither indivisible, perfectly defined, or fully enforceable (e.g. Demsetz, 1998). As in the case of the traditional assumptions in the analysis of the lighthouse, this means that potentially erroneous explanations are put forward or that there are phenomena that the theory simply cannot address.

For example, Foss and Foss (2001) argue that Mark II PRE cannot discriminate between quasi-vertical integration (i.e. when a firm owns some of the specific assets deployed by its supplier) and full vertical integration, because the pattern of asset ownership may be the same under the two arrangements and therefore bargaining outcomes and incentives will be identical.[14] However, legally these arrangements are completely different (see also Chassagnon, 2011). This difficulty suggests a related difficulty. In Mark II PRE, the source of authority in an employment relation ultimately is asset ownership. Such ownership confers bargaining power over the employee, because the employer can deprive the employee of the assets that make him (more) productive. However, it is not clear what is the difference between an employment relation thus conceived and quasi-vertical integration (cf. also Hodgson, 2002). Again, however, the two institutions are legally entirely different. In this context, another fundamental problem is that in a firm setting having formal ownership of assets simply does not translate into effective control over the use of these assets by employees. In addition to problems of moral hazard, there are also problems of employee skills or capabilities.[15]

It may be argued that Mark II PRE was never designed to explain as broad a set of phenomenon as those covered by Mark I PRE. In particular, Mark II PRE primarily applies to the theory of the firm; to Mark I PRE, this was just one application. The case may be made that within its more narrow field Mark II PRE represents an instance of theoretical progress compared to Mark I PRE. Thus, Mark II property right theory addresses a well-defined set of externality problems that arise in contractual relations where efficient investments in human assets cannot be contracted over. Within this particular setting one may ask if the theory arrives at the correct answer to the problem it addresses. Given the assumptions, on which the theory is based, the solutions are logically deduced from the premises stated in the theory. The optimal allocation of ownership over physical assets depends on which of the set of different identifiable allocations

14 For similar reasons, Holmström (1999: p 100) says that 'property rights theory, as articulated in Hart and Moore (1990) and other representative pieces, says very little about the firm'. Starting from a Penrosian position, Loasby (1995) makes a very similar point.

15 Thanks to an anonymous reviewer for this point.

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of ownership over physical assets that most efficiently reduce the negative externalities in the transaction between two parties, the efficient ownership pattern defining the boundaries of the firm. Thus, Mark II implicitly assumes that the institutional arrangement that we call a firm is meaningfully conceptualized as common ownership of a bundle of physical assets.[16]

Although Mark I PRE did not provide a single unifying answer to the question of what determines the boundary of a firm, it is unlikely that an answer would have involved the notion of asset ownership. As we have argued, to Mark I PRE theorists, this analytical category simply is too vague in the sense that its economic significance is contingent, depending on specific legal and social institutions as well as on private enforcement. To be sure Mark I contributions to the theory of the firm (e.g., Alchian and Demsetz, 1972; Barzel, 1982; Cheung, 1969) emphasize the difference between the working of the price system in markets and the use of direction within firms. Similarly, these contributions perceive of firms as solutions to some kind of externality problem. However, in contrast to Mark II PRE, they emphasize how transaction costs in a broad sense (and not the problem of verifiability) are at the root of the problem of externality. Moreover, Mark I PRE stresses the importance of understanding the cost associated with the working of different institutional arrangements. Coase (1960: 17) for example, discusses the use of markets and firms as solutions to externality problems arising from neighboring effects and concludes that the '. . . firm is not the only possible answer to this problem. The administrative cost of organizing transactions within the firm may also be high, and particularly so when diverse activities are brought within the control of a singular organization'. Thus, all relevant cost and benefits must be taken into account before any one institutional arrangement (such as a firm) is proclaimed as the solution to a particular problem.

4. Conclusion

Few economists today define themselves as working in the Mark I PRE tradition (but see, e.g. Allen and Lueck, 1998; Barzel, 1997). The publication of Grossman and Hart (1986) fundamentally changed the discourse on property rights in economics and had profound implications for the development of the economics of the firm. According to its proponents, Mark II PRE have explanatory advantages relative to the competitors (not only Mark I PRE, but also transaction cost economics, Williamson, 1996) (Grossman and Hart, 1986; Hart, 1996). The

16 Other perspectives on the firm suggests, in the tradition of Marshall (1920), that the firm is more adequately characterized by its unique knowledge-base. For an excellent early comparative discussion, see Loasby (1995). Loasby's views imply an interesting parallel between Coase's preference for a case-by-case approach, highlighting specific transaction costs in specific situations, and the knowledge-based view of the firm which also implies that (while general principles can be invoked) a more detailed, case-by-case approach is necessitated on account of the idiosyncrasies of individual firms.

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fact that it is formulated as a formal, game theory approach gave Mark II PRE a clear advantage relative to the (largely) verbal Mark I PRE. Not surprisingly, Mark II PRE is currently the dominant approach to the economics of the firm in the top economics journals.[17]

Stigler (1983) argued that on efficient research markets, the true theoretical value of older contributions to economics would be internalized in contemporary contributions in more rigorous and pure form. Thus, with such markets, economic science grows with perfect recall, as it were. However, in actuality the economics profession is forgetful, and this is one reason why research markets are not efficient. A simple reason why (valid) ideas may be forgotten is that the discoverer of those ideas dies, becomes interested in other subjects, etc. in other words, when the relevant ideas are no longer promoted (Anderson and Tollison, 1986). Moreover, even in spite of promotion efforts by the inventor of ideas, the profession may remain ignorant of the relevant, important ideas if insufficient alertness (Kirzner, 1973) is exercised by its members. The spread of ideas needs discoverers *and* promoters.

The history of economics witnesses many cases where new theorizing involved introducing drastic simplifications and bypassing much of the subtlety of earlier research traditions. For example, the case has been made that the Keynesian revolution involved suppressing earlier, sophisticated thinking on asymmetric information and the role of relative prices in directing resource uses (e.g. from different perspectives, Leijonhufvud, 1981; Lucas, 1977). Many proponents of heterodox traditions in economics routinely make this case on behalf of their own revitalized tradition.

In this study, we have made a similar case for the change from Mark I to Mark II PRE. Seemingly, Mark II PRE was able to resolve a number of unresolved problems in the older approach, such as what it means to own an asset. The notion of residual rights of control seems to offer a clean answer to this. However, it is an answer that comes at the expense of making strong assumptions concerning the enforceability of titles to ownership and the divisibility of residual rights of control. When such assumptions are relaxed, ownership becomes a much more blurry concept. Although one can still meaningfully talk about who owns specific rights to use an asset or derive income from it, it may often not be unambiguous who owns an asset, or indeed the corporation. However, this directs attention to the many ways through which individuals in actuality regulate the uses of assets and how agents' protection as well as capture of rights are enabled and constrained by real institutions, including legal and political institutions (Hansman, 1996; Sened, 1997).

Examining the multi-facetted nature and many different manifestations of property rights, and how these can be analyzed as the outcomes of constrained

17 Other, older economics approaches, such as that of Penrose (1959), are also now basically absent from the top economics journals (while thriving in management research). See Loasby (1995).

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maximization within an institutional and political matrix, was a central explanatory task of Mark I PRE. In essence, this is the program defined in Coase (1960). Compared to this rich and ambitious program, the change from Mark I to Mark II PRE resulted in a gain in formal precision, which was obtained a cost of narrow analytical scope. Differently put, the assumptions in Mark II PRE that asset ownership is indivisible, perfectly defined, or fully enforceable have eased modeling efforts, but at the cost of explanatory scope and realism. Whether Mark II PRE will eventually embrace the complexity of Mark I PRE is an open question.

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