The Invisible Hand Mechanism of Property Appropriation

David Ellerman
Department of Economics
University of California at Riverside
david@ellerman.org
www.ellerman.org

Abstract

A theory of property needs to give an account of the whole life-cycle of a property right: how it is initiated, transferred, and terminated. Economics has focused on the transfers in the market and has almost completely neglected the question of the initiation and termination of property in normal production and consumption (not in some original state or in the transition from common to private property). The institutional mechanism for the normal initiation and termination of property is an invisible-hand function of the market, the market mechanism of appropriation. Does this mechanism satisfy an appropriate normative principle? The normative principle of assigning or imputing legal responsibility according to de facto responsibility is the standard juridical principle. It is given a historical tag of being "Lockean" but the basis is contemporary jurisprudence, not historical exegesis. Then the fundamental theorem of the property mechanism is proven which shows that if "Hume's conditions" (no transfers without consent and all contracts fulfilled) are satisfied, then the market automatically satisfies the Lockean responsibility principle, i.e., "Hume implies Locke." As a major application, the results in their contrapositive form, "Not Locke implies Not Hume," are applied to a market economy based on the employment contract. It is shown the production based on the employment contract violates the Lockean principle (all who work in an enterprise are de facto responsible for the positive and negative results) and thus Hume's conditions must also be violated in the marketplace (in spite of the labor contract, de facto responsible human action cannot be transferred from one person to another as is readily recognized when and employer and employee together commit a crime).

Table of Contents

Introduction

From Adam Smith onward, economics has analyzed the idea of an invisible hand mechanism in the price system. But underlying the price system, there is a more basic system of private property rights. When the system of property rights is analyzed in its own right, it turns out that there is also an invisible hand mechanism in the property system. It governs the initiation and termination of property rights in an on-going market economy (as opposed, say, to some one-time initial appropriation in a "state of nature"). That property mechanism, the underlying normative analysis, the fundamental theorem for the property system, and the application to the current private property market economy are the topics of this paper.

The Conventional Neglect of the Question of Appropriation

Property rights have a life cycle; they are created, transferred, and eventually terminated. Market contracts transfer property rights but what is the institution for the creation and termination of property rights? It turns out that the market also provides, under normal conditions, the mechanism for the initiation and termination of property rights. Our first task is to explain this little-noted role of the market.

In ordinary economic activity, property rights are being constantly created in production and they are constantly being terminated in consumption (consumption goods) as well as production activities (inputs consumed in production). It is a remarkable fact—which itself calls for explanation—that the literature on the economics of property rights does not even formulate the question about the mechanism for the initiation and termination of property rights in these normal activities. For example, the question is ignored in the "economics of property rights" [e.g., Furubotn and Pejovich 1974], in the "property rights approach" to the firm [e.g., Hart and Moore 1990], in the Putterman and Kroszner anthology [1996] of papers on the "economic" nature of the firm, in the "property rights" literature of the new institutional economics [e.g., Furubotn and Richter 1998], or in the law and economics literature [e.g., Cooter and Ulen 2004; Miceli 1999].

Before turning to an explanation, we could simplify the terminology about the eventual termination of property rights by referring to the legal termination of a property right as the legal assignment or appropriation[1] of the liability for that property:

termination of an asset = appropriation of the liability (for the asset).

Algebraically this is the familiar idea that "subtracting a plus quantity" is the same thing as "adding a minus quantity." Hence the question before us is the mechanism for the appropriation of the assets *and liabilities* created in normal production and consumption activities.

---

[1] The termination of rights was an original meaning of "expropriation." "This word [expropriation] primarily denotes a voluntary surrender of rights or claims; the act of divesting oneself of that which was previously claimed as one's own, or renouncing it. In this sense, it is the opposite of 'appropriation'. A meaning has been attached to the term, imported from foreign jurisprudence, which makes it synonymous with the exercise of the power of eminent domain, ... " [Black 1968, 692, entry under "Expropriation"] Since "expropriation" now has this acquired meaning, I will treat the "expropriation (termination) of rights to the assets +X" as the "appropriation of the liabilities –X."

One reason for the neglect is that discussions of property creation tend to be restricted in the philosophical literature to a rather mythical state of nature [e.g., Locke 1960 (1690)] or original position, or, in the economic literature, to the "appropriation" of unclaimed or commonly owned natural goods [e.g., Cooter and Ulen 2004] rather than the everyday matters of production and consumption of commodities where property rights are created and terminated "on the fly." For instance, Harold Demsetz [1967] considers how private property in land with fur-bearing animals was established as a result of the growth of the fur trade. John Umbeck [1981] considers how rights to gold deposits were created during the 1848 California gold rush on land recently ceded from Mexico. Yoram Barzel [1989] considers how the common property rights to minerals under the North Sea were privatized but ignores the assignment of initial rights in normal production [e.g., in his Chapter 5, "The formation of rights"].

On the negative side, the law and economics literature looks extensively at the assignment of liabilities in the legal trials that may follow the destruction of property in torts or crimes. But there is no attention to the mechanism for assigning the liabilities for the production inputs and consumption goods that are used up or consumed in normal production and consumption activities where legal trials are clearly not the mechanism for liability assignment.

Fundamental Myth that Product Rights are Part of Capital Rights

In the case of the product of production (leaving aside the input liabilities and consumption for the moment), there is a reason—albeit a mistaken one—for not formulating the question of appropriation. It is rather commonly thought that the product rights are "attached to" or are "part and parcel of" some pre-existing property right such as the ownership of a capital asset, a production set, or, simply, the firm. This idea in various forms is so ubiquitous that it might be termed the "fundamental myth" about the private property system.

To see the fallacy, one only has to consider the result of renting the capital employed in production. The party who hired in the capital and paid for all the other used-up inputs would have the legally defensible first claim on the produced output, not the owner of the capital asset to whom the rent was being paid as one of the input costs.

The simplest version of this fundamental myth is the assumption that the bundle of rights that constitute ownership of a capital asset includes "a right of ownership-over-the-asset's-products, or *jus fruendi*" [Montias 1976, 116], the "right of usufruct [which] entitles the holder to the 'fruits' or 'produce' derived from an asset" [Furubotn and Richter 1998, 79], or simply "the right to the products of the asset" [Putterman 1996, 361].

When confronted with the rental argument (the owner of a rented-out asset is not the owner of the product produced using the asset), some believers in the fundamental myth respond that the owner of the asset sold the "rights to the asset's products" to the appropriator all as part of the rental contract. The derived demand for an input based on what x might be produced using the input is misconstrued as the legal doctrine that the rights to the output x was a part of the rights to the input. This view does not pass the elementary test of being consistent with more than one rented asset being used in production. If rented assets A, B, and C were used in the production of x, did the appropriator of x supposedly get the pre-existing rights to x from the A-owner, the

B-owner, or the C-owner? And if the producer bought the services K of an asset and produced x, did the producer pay the asset owner for the rights to x or for the rights to K (perhaps with the x-right thrown in for free)? If market conditions change and the producer ends up producing y, were those y-rights also part of the rental contract? There seems to be no end to the muddles that arise from misinterpreting the notion of derived demand for an input as a legal doctrine about right to the outputs in order to continue avoiding appropriation in production.

The idea of an "asset's product," the "'produce' derived from an asset," or "the products of an asset" has a quaint nineteenth century flavor prior to the development of the reasoning associated with marginal productivity theory.[2] With MP theory, it was generally understood that the services of many assets may be employed in the production of the product and that imputation according to the argument "without my asset (e.g., A, B, or C), there is no product" does not pass the consistency text since it might apply to many complementary assets. There are no grounds of unique physical causality to represent the product as the "fruits" or "produce" of one asset (e.g., the land) rather than another. And no consistent account of the product rights to x can have them be a pre-existing part of each of several assets.

Appropriation is algebraically symmetric; liabilities as well as assets are appropriated in production. The misinterpretation of the MP theory of derived demand as a legal doctrine about output rights has a mirror image misinterpretation about the "imputation" of the input-liabilities to the output demanders. Instead of seeing the customers as buying the outputs, one could metaphorically picture the customers as incurring the input-liabilities. Hence they are pictured as the legal recipients of the input-liabilities which is what they are paying for, not the rights to the outputs. Instead of paying for the marginal unit of output, they are seen as incurring the liabilities for the inputs needed to produce that marginal output, liabilities whose competitive value is the marginal cost. Hence this dual set of metaphors tells a story about the marginal cost pricing of outputs just as the original story was about the marginal productivity pricing of inputs.

When both doctrines of price theory are misconstrued as theories of legal rights, then we have input-suppliers pictured as sellers of outputs and output demanders pictured as purchasers of inputs. All trace of the appropriation of the output-assets and input-liabilities in the firm is gone. The fundamental myth has found its dual. Input-liabilities are seen as part of output-rights just as output-assets are seen as part of input-rights. One can have more amusement trying to make sense of the dual muddle. In the case of joint products D, E, or F, are the input-liabilities attached to D, E, or F? Does the customer pay for the inputs whose value was the marginal cost or for the unit of output (with the input-liabilities thrown in without extra cost)? It is particularly amusing to consider the effect of the primal and dual fundamental myths at the same time. When the firm makes a payment to the input-supplier, the firm is "really" buying the rights to the output, but when the customer ostensive is buying the rights to the output from the firm, the customer is "really" buying the inputs!

---

[2] Even MP theory is not well-formulated in conventional economics since it pictures the marginal product of an input as being so many units of output. But there is no "immaculate production" of an output using only one input so the marginal product should be a vector with both positive and negative components. That vectorial treatment of MP theory is outlined in the Appendix.

Perhaps the main conclusion that one can draw from many economists' penchant to misconstrue price theory as a doctrine about legal rights is a fundamental reluctance to take legal rights seriously. The simple legal facts that firms buy inputs and sell outputs are set aside in favor of "deep" metaphors that picture input-suppliers as selling rights to outputs (not inputs) and output-demanders as buying the rights to inputs (not outputs)! Voilà, no appropriation!

Returning to the (primal) fundamental myth, yet another version is to take the "asset" as being a production opportunity as described by a production function or a production set. Entrepreneurs are "bidding for ownership of the firms" and become the "owners of the productive opportunity" [Hirshleifer 1970, 124-5]. A proprietor may sell "the rights to the transformation function" or "his rights to the venture" [Fama and Jensen 1996, 341] to another proprietor. The entrepreneur is the "owner of a production function" [Haavelmo 1960, 210]. Hence the technological relationship between inputs and outputs is hypothecated as a form of property. In addition to buying or already owning all the inputs to production, the poor entrepreneur now has to also get "ownership" of the "production function"!

But perhaps the primary source of the fundamental myth is the confusion between owning a corporation and "owning" the productive opportunity that a corporation may or may undertake depending on its contracts. The line of reasoning is: "a corporation is an owned asset and a corporation owns the products it produces so there is no need for some mechanism to account for the ownership of the product—it's all part of the ownership of the firm." It is only a tautology to say that a corporation owns "its products"; the question is how did the products produced in a certain productive opportunity become "its products." For instance, must the Studebaker Corporation own the cars rolling off the end of the assembly line in the factory owned by Studebaker? Since Studebaker at one point leased its factory building to another automaker, the answer is "No." Those cars were owned by the other company who was making the lease payments and paying for all the other inputs in car production and who thus would have the defensible claim on the cars rolling off the end of the assembly line.

The simple fact is that the ownership of a corporation is the indirect ownership of the corporate assets (e.g., the Studebaker factory building). Whether or not the company owns the products produced using some of those assets depends on whether the company hires or leases out those assets to some other party (who would then appropriate the product) or the company hires in a complementary set of inputs to undertake the production opportunity itself. The legal party who ends up appropriating (i.e., having the defensible claim on) the produced assets is the party who was the contractual nexus of hiring or already owning all the inputs used up in production (and thus who "swallowed" those liabilities). Since that party undertaking production is determined by who was the nexus of the hiring contracts (who hires or already owns what or whom), the rights to the product are not part of some prior bundle of rights to a capital asset or to a corporation.

The grip of the fundamental myth in one form or another seems to account for the failure to formulate the concept of a mechanism for the appropriation of the assets and liabilities that are created in normal production activities.

The Invisible Hand Mechanism of Property Appropriation

Since Adam Smith, economic theory has worked to elucidate the invisible hand mechanism embodied in the price system that guides property rights to an efficient allocation. The life-cycle of property rights includes not just transfers in the market but the initiation and termination of the property rights. The market also embodies an invisible hand mechanism that governs the initiation and termination of property rights—but the very idea of this mechanism has been neglected due to the many forms of the fundamental myth that the product rights are already included in pre-existing asset rights.

To "see" an invisible hand, it is helpful to look at the corresponding visible hand and then to see what happens in the absence of the visible hand. There is a visible-hand mechanism of appropriation used when the legal system intervenes into the market. The prime example is a trial to assign the legal liability for property that has been destroyed. Such a trial also illustrates the underlying juridical norm that we will use in the fundamental theorem about the invisible hand property mechanism. That norm is the *responsibility principle*: assign the de jure or legal responsibility to the person or persons who were actually de facto responsible for destroying the property.

The invisible hand mechanism for the legal assignment of initial and terminal rights comes into play when there is no explicit trial—when the visible hand of the legal authorities does not intervene and when it thus, in effect, renders the *laissez faire* judgment of "let it be." Using the Smithian metaphor, we might even conceptualize "non-action" on the part of the legal authorities as the ruling of the "Invisible Judge" who always rules "let it be."

In the tradition of Ronald Coase [1960], there has been an emphasis on a legal system defining clear property rights. Property rights are defined as much by the inaction of the legal system as by its actions. When sparks from a passing locomotive burn the crop growing in a farmer's field and the Invisible Judge rules "let it be" (i.e., the legal authorities for whatever reason allow no action), then at least the right to take that specific action was, in effect, established on the part of the railroad and the liabilities for the damaged crops were, in effect, assigned to the farmer.

There are two types of contracts where the role of the Invisible Judge is particularly important, namely, the first and last transfer contracts in the life-cycle of a commodity.[3] When a newly produced commodity is first sold and the Invisible Judge lets it be, then the first property right was, in effect, assigned to the first seller. Conversely, when a purchased commodity is subsequently consumed, used up, or destroyed and the Invisible Judge lets it be, then the liability was, in effect, assigned to the last buyer. Thus we have the:

<u>Market invisible hand mechanism of appropriation</u>:
The property rights (or liabilities) to newly produced (respectively, finally used-up) commodities are assigned to the first seller (respectively, last buyer) of the commodities.

---

[3] Our focus is on commodities, rivalrous and excludable private goods that are produced and consumed as a part of deliberate human activity—even though in the distant past there may have been endowments of unproduced goods.

The application to normal consumption is straightforward. When a commodity is consumed and the Invisible Judge lets it be then the liability for the using up or consumption of the commodity is in effect imputed to the last buyer.

The most important and consequential application of the market mechanism of appropriation is to normal production activities. Abstractly considered, one legal party purchases (or already owns from past purchases or activities) all the "inputs" (e.g., raw materials, intermediate goods, and services) to be used up in the production process. When those inputs are used up and new products or outputs are produced, then the last buyer of the inputs is in a legally defensible position to be the first seller of the outputs unless the legal authorities would intervene to overturn both sets of contracts. Hence when no such intervention takes places—as in normal production—then that one legal party in effect legally appropriates a bundle of legal rights and liabilities, the input-liabilities and the output-assets, which might be called the "whole product."

Origins of the Fundamental Myth

The intellectual space to ask the question of appropriation in production was opened up by the realization that product rights were not part of capital rights, i.e., the falsity of the "fundamental myth." Whence the fundamental myth? Marx shares responsibility by having given his imprimatur—expressed in his misnomer "capitalism"—but the idea goes back to older notions of land ownership. In feudal times, the governance of people living on land was taken as an attribute of the ownership of that land: "ownership blends with lordship, rulership, sovereignty in the vague medieval *dominium*,...." [Maitland 1960, 174] The landlord was Lord of the land. As Gierke put it, "Rulership and Ownership were blent" [1958, 88]. Marx mistakenly carried over that idea to his analysis of capital in capitalism. The command over the production process was taken as part of the bundle of capital ownership rights.[4]

> It is not because he is a leader of industry that a man is a capitalist; on the contrary, he is a leader of industry because he is a capitalist. The leadership of industry is an attribute of capital, just as in feudal times the functions of general and judge were attributes of landed property. [Marx 1967 (1867), 332]

Marx promoted the fundamental myth that governance and product rights were part of capital—one of the few points of seeming agreement between Marxism and orthodox economics. By "capital" Marx did not simply mean financial or physical capital goods; he meant those goods used by wage labor with private ownership of the means of production. Otherwise, "capital" becomes just the "means of labor." In short,

Marx's Capital* = Means of labor (capital) + contractual role of being the firm (using wage labor)

[4] This view survives to our day, e.g., the "rights of authority at the firm level are defined by the ownership of assets, tangible (machines or money) or intangible (goodwill or reputation)." [Holmstrom and Tirole 1989, 123] The cavalier inclusion of "goodwill" (never mind "reputation") in "the ownership of assets" is all too typical in the standard economic literature—not to mention any inkling that the "rights of authority at the firm level" might have something to do with the employment contract.

If one wishes to use the word "capital*" in that Marxian sense, then one gives up being able to talk about the "*ownership*" of capital* since there is no "ownership" of a contractual role. But Marx continued to talk about "capital" as being owned, a common fallacy of using the same word with different meanings at different places in an argument. Many versions of the fundamental myth take the form of assuming that the capital owner has the contractual role of being the firm (i.e., capital*) and then taking all the property rights accruing to capital* as being part of the ownership of capital.[5]

For instance, take the common notion of "owning a factory." There is the ownership of factory buildings (or corporations with such assets), but there is no "ownership" of the going-concern aspect of *operating* a factory since that is a contractual role in a market economy. By using the same phrase "owning a factory" to straddle both meanings, one could seem to have an "argument" that the contractual role of operating a factory was "owned." For instance, when it is pointed out that *operating* an owned factory is a contractual role separate from owning the factory (since the factory could also be leased out), not an extra owned property right, a typical response is: "Yes, but it is that role that is called the 'ownership*' role." After thus redefining factory-ownership* to include the contractual role, the semantics shifts back to conclude that "the product rights are part of factory-ownership*" [see the "property rights approach" to the firm in Hart and Moore 1990]. Such loose arguments based on shifting semantics are common in the orthodox (and Marxist) literature and allow the fundamental myth to persist.

Normative Theory of Appropriation and Transfers of Property

The Methodology of the Paretian Criterion

The fundamental theorem for the competitive price mechanism proves a correspondence between the descriptive or positive notion of a competitive equilibrium and the normative notion of Pareto efficiency. The fundamental theorem for the market mechanism of appropriation has the same logical form of a correspondence between a descriptive situation and a normative principle of appropriation.

The normative principle of appropriation used here is the responsibility principle: assign de jure (or legal) responsibility in accordance with de facto (or factual) responsibility. Since this principle is used in the interventions of the visible hand of the law, i.e., legal trials, it is natural to see under what conditions the invisible hand mechanism of the property system follows the same principle. That is the main justification for using the responsibility principle in normative property theory.

However, there is another reason that might be of interest to economists, namely the principle follows—in its own way—the same methodology as the Paretian criterion. That methodology has two components: 1) the definition of a normative notion by identification with a certain special descriptive notion, and 2) the restriction of that definition to persons.

In the case of the Paretian criterion, a Pareto efficient state is one that is a vector maximum of individual welfares: no person's welfare can be increased without decreasing the welfare of

[5] Of course, authors who semantically slide back and forth between "capital*" and "capital" do not signal it by the inclusion or exclusion of the asterisk.

another person. The normative notion of a person's welfare is defined by identifying it with the person's preferences.

> The matter can be put somewhat formally by saying that a person's welfare map is defined to be identical with his preference map—which indicates how he would choose between different situations, if he were given the opportunity for choice. To say that his welfare would be higher in A than in B is thus no more than to say that he would choose A rather than B, if he were allowed to make the choice. [Graff 1967, 5]

Secondly this type of identification is restricted to persons even though one can define the (revealed) preference map of rats, insects, and other animals and perhaps even for inanimate objects.

In the normative theory of appropriation of assets and liabilities, the task is to define the normative (de jure or legal) notion of responsibility for the imputation of the assets and liabilities. The first methodological principle would define that de jure responsibility in terms of de facto or factual responsibility. And by the second principle, the definition would be restricted to persons—as in fact the law does.

There is an old literary metaphor (a version of the pathetic fallacy) where natural forces are pictured as being "responsible" for certain consequences. Economists sometimes indulge these picturesque images as when an asset is imagined as producing a product (e.g., some versions of the fundamental myth) or when natural forces and human actions are coupled together as if both were de facto responsible. "Together, the man and shovel can dig my cellar" and "land and labor together produce the corn harvest" [Samuelson 1976, 536-537]. However since the demise of primitive animism as a legal theory (e.g., after the trials of child-killing pigs and egg-laying roosters during the Middle Ages), the law has only recognized persons as being capable of being responsible. The responsibility for the results of using tools or assets is imputed back through the things to the human users. For instance, a description without the pathetic fallacy would be that a man is responsible both for using up the services of a shovel and for thereby digging a cellar (note the positive and negative side of responsibility)—or that labor uses up the services of land in the production of the corn harvest.

The legally-trained economist, Friedrich von Wieser, introduced a broader persons-and-things notion of imputation (Z*urechnung*) into the discourse of economics but this was only an analogy with the juridical theory. Modern jurisprudence has always been clear that the responsibility principle applies to responsible persons.

> The statement that an individual is *zurechnungfähig* ("responsible") means that a sanction can be inflicted upon him if he commits a delict. The statement that an individual is *unzurechnungsfähig* ("irresponsible")—because, for instance, he is a child or insane—means that a sanction cannot be inflicted upon him if he commits a delict. ... The idea of imputation (*Zurechnung*) as the specific connection of the delict with the sanction is implied in the juristic judgment that an individual is, or

> is not, legally responsible (*zurechnungsfähig*) for his behavior. [Kelsen 1985, 364]

Regardless of their causal efficacy, physical assets and animals are, *a fortiori*, *unzurechnungsfähig*.

There is certain ambivalence, if not incoherence, in conventional economics about the treatment of human preferences on the one hand and the human actions that express those preferences on the other hand. Human preferences are singled out over the revealed preferences of animals and things for special treatment in normative economics. Anyone who defined Pareto efficiency using a vector ordering that included the preferences of shoes, ships, sealing-wax, and cabbages as well as persons would be considered somewhat daft. Yet the standard practice in economics is to list the services of things and animals along side responsible human actions in an undifferentiated list of "inputs" as in the generic production function $y = f(x_1, x_2,\ldots, x_n)$. Any prosecutor who hauled the instruments of a crime into court along with the alleged perpetrator and charged them all with the crime—would also be considered somewhat odd or perhaps as having taken too many economics courses. In any case, the responsibility principle in jurisprudence singles out persons as being the sole source of responsibility, and that is the legal theory modeled here.

After the Paretian criterion of efficiency, normative economics faces a fork in the road. One path is welfare economics, and that is the path usually taken. For instance, one standard path beyond the Paretian criterion is to use the Kaldor-Hicks criterion (a potential Pareto improvement where the gainers could but don't necessarily compensate the losers) to modernize the Marshall-Pigou tradition of welfare economics. A proposed social change satisfying the KH criterion is parsed into an increase in a monetized social pie ("social wealth") and a redistribution of the pie. The welfare economist can supposedly recommend the increase in "social wealth" as an increase in "efficiency" while the redistributive part of the change is a separate question of "equity" outside of the bailiwick of the professional economist. This methodology is the basis for the standard economic treatment of the law (Chicago wealth-maximization school of law and economics) and for cost-benefit analysis.

However, the author [2004] has elsewhere shown that this attempt to travel the road beyond the Paretian criterion in the direction of welfare economics falls apart under a simple numeraire-reversing redescription of the proposed change. That redescription of exactly the same proposed change reverses the "efficiency" part and the "equity" part of the Marshall-Pigou-Kaldor-Hicks analysis—so any "professional" economic policy recommendations based solely on that faulty logic would also be reversed.[6]

[6] There is another path to welfare economics, namely the postulation of a given "social welfare function" in the Bergson-Samuelson tradition but the only agreed-upon properties are those already implicit in the Pareto criterion. Thus it is unclear how it is an "advance" aside from the postulation. A theologian can postulate "God's preference function" with various properties such as individual human welfares having positive first partials and then can go through academic exercises showing how God would evaluate various human events. But an atheist would be unimpressed.

The alternative and less traveled road beyond the Paretian criterion is a rights-based theory that takes seriously the incommensurability of individuals and that eschews any notion of social welfare. The normative property theory developed here uses the "Paretian" methodology (as explained above) and then takes the rights-based path.

Rights-Based Normative Economics

The Kaldor-Hicks variety of welfare economics attempts to move beyond the Paretian criterion by weakening it to the Kaldor-Hicks criterion and then trying to construct a monetized social pie to parse into size of the pie and distribution of the pie questions. The normative property theory developed here moves beyond the Paretian criterion by applying the same methodology outlined above to other attributes of human subjects that just preferences. As noted, the responsibility principle applies the same methodology to responsibility; the normative notion of responsibility is to be identified with de facto responsibility of persons.[7]

If the responsibility principle governs the appropriation of assets and liabilities—the beginning and end points in the life cycle of a property right—then what is the principle to govern the transfers in between? The same methodology yields the obvious solution, the principle of consent. The legally permitted transfers in property rights of a person are to be those that have the subjective permission or consent of the owner. "Consent is the moral component that distinguishes valid from invalid transfers of alienable rights." [Barnett 1986, 270]

With the consent principle in hand, the Paretian criterion of efficiency can now be reinterpreted in the rights-based approach. In the context of social welfare economics, the Paretian conditions are interpreted as necessary conditions for a maximum ("bliss point") of social welfare. Since a rights-based approach would have no notion of an a priori given social scalar quantity that morally ought to be maximized ("social welfare"), it is important to give a rights-based rendition of Pareto efficiency. Sometimes writers in welfare economics seem to only consider individual welfare as only having any moral weight as it applies to one's "own affairs." Preference spillovers to other people's affairs are not treated as having the same moral weight. In any case, such preference externalities are ruled out when the notion of Pareto efficiency is put to work in the fundamental theorem about the Pareto efficiency of a competitive equilibrium.

On a rights-based approach, the tendency to give more weight to preferences about one's own affairs is a hidden reference to the domain of one's rights. Preferences are realized by consent to changes that affect one's rights, and spillover preferences about the affairs of others are outside of one's rightful sphere of consent. Thus a rights-based rendition of Paretian efficiency is that an allocation of rights is efficient if there are no mutually voluntary reallocations of rights that are desired by anyone. Assuming that a person would not consent to a reallocation that made the person worse off, then this rights-based notion would agree with the usual Paretian notion in the absence of preference spillovers.

Property theory as modeled here is about the appropriation and transfers of property in production and consumption in an on-going market economy. The theory is silent on any initial

---

[7] "[This] is itself a principle about natural responsibility, and so, as a guide for adjudication, unites adjudication and private morality and permits the claim that a decision in a hard case, assigning responsibility to some party, simply recognizes that party's moral responsibility." [Dworkin 1985, 288]

endowment of property rights. The Lockean idea that one should appropriate the fruits of one's labor applied to the commons is an application of the responsibility principle. But one's labor also had the negative fruits of using up some portion of the commons and the same principle implies that one ought to hold that liability. The question of endowment is about to whom that liability for using up the fruits of nature should be owed. Is it "society" as organized in the state? Is it some version of past, present, and future humanity? Is it humanity in one's own person so that no external liability is owed? The normative theory given here does not specify an endowment point; it simply assumes one so that we may model the appropriations and transfers in the normal production and consumption activities of a private property market economy.

By the consent principle, the normatively permitted transfers of property right between parties[8] are the transfers voluntarily agreed to by the parties. Usually this consent would take the form of reciprocal conditional-consent or *contract*: "I consent to transfer X to you if you transfer Y to me" on the one side with the complementary conditional consent on the other side: "I consent to transfer Y to you if you transfer X to me." A legal system accepting this consent definition of which transfers are to be made would then try to have all and only those transfers—the legal contracts—made.

There are exactly two ways this might go wrong: 1) if a property transfer was made without any voluntary contract, which will be called a "property externality" or simply an *externality*, or 2) if a contract was not fulfilled by the actual transfers, namely, a *breach*. For instance, a legal system would typically not accept that a contract has been made until one side delivered, e.g., X was delivered from one party to the other. If Y was not delivered in the opposite direction, then the condition on the conditional transfer of X was not fulfilled, so that transfer of X without consent constitutes the rights violation or breach of the contract by the non-delivery of Y.

In this simple model of the property system, the legal system has two normative tasks: to implement the responsibility principle in the production and consumption activities of the parties, and to implement the consent principle in mutually voluntary transfers between parties. The responsibility principle is concerned with the internal activities of the parties whereas the transfer contracts deal with the external relationships between parties. But in a market system, the two tasks are related. The key result, the fundamental theorem, is that if the legal authorities just ensure that the contractual machinery works correctly in the external relationships between parties—no externalities and no breaches—then the market mechanism of appropriation will indeed satisfy the responsibility principle in the internal activities of the parties.

It is useful to put historical tags on the external condition about transfers and on the internal condition about appropriation. The conditions on transfer—no externalities and no breaches—will be called "Hume's conditions" because of his emphasis on "*transference by consent,* and *of the performance of promises.*" [Hume 1978 (1739), Book III, Part II, Section VI, 526]. The responsibility principle concerning appropriation will be called "Locke's principle."[9] The fundamental theorem then takes the form: "Hume implies Locke."

---

[8] A "party" is here a person or a set of persons who have joint ownership of a property right.

[9] These historical tags are not intended as an explication of Hume's or Locke's thought. Indeed, I have argued elsewhere [1992] that Locke's theory was quite ambiguous and that he might not be a "Lockean" in the sense of adhering to the responsibility principle.

The Fundamental Theorem for the Property Mechanism

Our task is to give the correctness theorem for the market mechanism of appropriation—to show that if the market contractual mechanism works correctly (no breaches or externalities), then the invisible hand mechanism of imputation operates correctly in terms of the responsibility principle.

It is important to be explicit about certain underlying assumptions in standard economic models. Each party has a certain set of commodities (goods and services) within the party's possession and control which we might call the party's *possessions*. In the one-period individual consumption problem of maximizing utility $U(x_1,\ldots,x_n)$ subject to a budget constraint $p_1x_1 + \ldots + p_nx_n = B$, there are several (often implicit) assumptions that relate the x_i's that occur in the utility function to those that occur in the budget constraint. If five pounds of meat are purchased but then accidentally spoil, then the meat will appear in the budget constraint but not in the utility function representing consumption. Or there might be vicarious consumption of commodities in some other party's possession that would not appear in the budget constraint. Both these possibilities are ruled out in the efficiency theorem for the price mechanism (i.e., that a competitive equilibrium is Pareto efficient), and we must make similar (no-accident and no-vicarious consumption) assumptions about the property mechanism.

This motivates the set of assumptions that relates the party's de facto responsible actions to the internal changes[10] in a party's possessions. Just as it is conventionally assumed that consumer goods do not accidentally spoil or get destroyed but are deliberately consumed, so we must rule out accidents by assuming that the internal changes in a party's possessions are made by the party's de facto responsible actions. And the analogy of "no vicarious consumption" is the locality or no-action-at-a-distance principle that de facto responsible action can only operate on commodities in the party's possession or control (i.e., responsibility implies causality). By these no-accident and locality assumptions, the positive and negative results of a party's de facto responsible actions are exactly equal to the internal changes in the party's possessions. We could abbreviate this as:

"de facto responsibility = internal changes in possessions."

Now we turn to the legal system's task of enforcing the rules about the external changes, the changes due to transfers with other parties. In the consumption example, the purchased x_i's that appear in the budget constraint might not be delivered (a breached purchase contract), and there might be some commodities "delivered" from another party which were not purchased as in an externality (e.g., a theft or conversion). The enforcement of Hume's no-breach and no-externality conditions means that the external changes in each party's possessions are precisely those made by the legal contracts with other parties. When the same commodity is bought and sold by a party (and transferred in and out), then it nets out so the external changes (always in net terms) in a party's possessions are those indicated by the first-sale and last-purchase contracts (netting out pure transfer contracts). We could abbreviate the enforcement of the no-breach and no-externality rules as:

[10] These "internal changes" are sometimes thought of as "trades with Nature" as opposed to trades with other parties.

"external changes in possessions = first-sale and last-purchase contracts."

We previously saw that in the market mechanism of appropriation, the Invisible Judge imputes legal responsibility according to the first-sale and last-purchase contracts. We could abbreviate this mechanism as:

"legal responsibility = first-sale and last-purchase contracts."

To complete the theorem, it only remains to note the mathematical result that: "internal changes in possessions = external changes in possessions." In graph theory, this is the "divergence principle" [Rockafellar 1984, 55] which is the discrete version of the fundamental theorem of calculus and its various higher dimensional generalizations such as the "divergence theorem" [see Fleming 1977]. For an intuitive picture, think of a fluid flowing into and out of a closed region in the plane. Fluid is also coming out of sources inside the region with a sink counting as a negative source. The divergence principle is that the net amount flowing out across the boundary of the regions (external changes) equals the net amount flowing out of the sources within the region (internal changes):[11]

"external changes in possession = internal changes in possessions."

We may put the assumptions, conditions, and mathematics together to have the:

<u>Fundamental theorem for the property mechanism ("Hume implies Locke")</u>:
If there are no breaches and no externalities in the market contractual transfers, then the market mechanism of appropriation imputes legal responsibility in accordance with de facto responsibility, i.e., operates correctly in terms of the responsibility principle.

Informal proof:

Legal responsibility =	(by the market mechanism of appropriation)
first-sale and last-purchase contracts =	(by enforcing no-externality and no-breach rules)
external changes in possessions =	(by divergence principle)
internal changes in possessions =	(by no-accident and locality assumptions)
de facto responsibility.[12]	

---

[11] The one-dimensional continuous version is the fundamental theorem of calculus. For example, consider a one-dimensional "tube" from point a to point b along the x-axis with the amount of the flow in tube at point x given by F(x). At each point between a and b, there is a flow source of strength F'(x) = dF/dx so by the divergence principle, the sum (integral) of all the sources within the region or interval from a to b is equal to the out-flow minus the in-flow across the boundaries of the tube: $F(b) - F(a) = \int_a^b F'(x)dx$.

[12] The proof is easily formalized using vector flows on graphs. In addition to this "correctness" theorem, there is also a converse "completeness" theorem that might be mentioned but is not emphasized here. Just as the correctness theorem puts property theoretic clothing on the graph-theoretic divergence theorem, so the converse completeness theorem is a property theoretic rendition of the theorem that given an assignment of vectors to nodes of a connected graph which sum across nodes to the zero vector, there is an assignment of vector flows to the arcs of the graph which yields the given assignment as the net flows at the nodes. In property terms, this means that given a set of

Enforce the contractual rules between the parties and then the Invisible Judge will make the right imputations to the parties. In the contrapositive form (Not-Locke implies Not-Hume), the theorem states that if there was a misimputation by the Invisible Judge, then it would have to show up publicly as a property externality or a breached contract. This is the property-theoretic refutation of Marx's charge that there could be exploitation in the "hidden abode of production" while the sphere of exchange "is in fact a very Eden of the innate rights of man" [Marx 1967 (1867), 176]. Marx's cleverness ran afoul of the cunning of the divergence principle.

Application to Production in the Employment System

The Facts of the Case

In view of the connection between transfers between parties (contracts) and the internal activities of the parties (e.g., production), analysis can start either place. We begin in the abode of production and then move to the sphere of exchange.

Consider a productive opportunity represented by the production function Q = f(K,L) where K represents all the non-labor inputs used up during the time period in the productive opportunity and L represents all the intentional human actions performed by all who work in the enterprise (managerial and non-managerial workers). The basic argument is that in performing the intentional actions L, the people working in the enterprise are de facto responsible for using up the inputs K and for producing the outputs Q. By the responsibility principle, they should jointly be the legal appropriators of the input-liabilities –K and the produced assets +Q. These are the underlying facts about de facto responsibility and about the application of the responsibility principle regardless of the legal or institutional superstructure.

In vectorial terms, the people working in the enterprise, by performing the actions L, produce the positive and negative results (Q,–K,0) which might be called *Labor's product*. It is customary in conventional economics to conceptualize the performance of these human actions as the "producing" of the labor services L which are then "used up" in production. Then the overall results of production would be represented as the *whole product* (Q,–K,–L). This might be called the "production vector" or "input-output vector" but for historical reasons, I will use the "whole product" terminology.[13] Using that representation, Labor's product can be parsed into two parts:

Labor's product = (Q,–K,0) = (0,0,L) + (Q,–K,–L) = "labor commodity" + whole product.

Now we view the facts of the case under the institutional structure of production based on the employer-employee contract.[14] Under the employment system, Labor (the people working in an

compatible de facto responsible activities by the parties, there is a set of property transfers between the parties so that those contracts will impute legal responsibility according to the given de facto responsible activities.

13 I have used the "whole product" phrase to recognize the tradition summarized by Carl Menger's jurisprudential brother Anton Menger [1899].

14 Marx's label "capitalism" was a misnomer due to his mistaken belief (fundamental myth) that the key institution was the private ownership of capital rather than the employment relation. A better name would be "employment system" which is used here.

enterprise), as the first seller of L, is recognized as initially owning (0,0,L). However, the employer (who we may or may not be the owner of the assets yielding the capital services K) is in the contractual position of the last buyer of all the inputs (K as well as L) and thus as the defensible claimant on the product Q. Thus the employer, in sum, legally appropriates the whole product (Q,–K,–L). This is summarized in the following table.

Labor de facto responsible for	(Q,–K,0)	= Labor's product
Labor legally appropriates	(0, 0, L)	= labor commodity
Labor responsible for but does not appropriate	(Q,–K,0) – (0, 0, L) = (Q,–K,–L)	= whole product.[15]

Responsibility Principle Violation under the Employment System

As previously noted, the notion of "imputation" was metaphorically introduced into economics by the legally trained Austrian economist Friedrich von Wieser in his treatment of marginal productivity theory at the end of the nineteenth century. Things as well as human actions are causally efficacious at the margin so Wieser metaphorically used the notion of "imputation" according to (scalar) marginal productivity which Wieser thought of as "economic responsibility." But he was well aware that this "economic" notion was not the same as the legal or moral notion of imputation which could only apply to human actions.

> The judge,..., who, in his narrowly-defined task, is only concerned with the legal imputation, confines himself to the discovery of the legally responsible factor,– that person, in fact, who is threatened with the legal punishment. On him will rightly be laid the whole burden of the consequences, although he could never by himself alone–without instruments and all the other conditions–have committed the crime. The imputation takes for granted physical causality.… The expression "this man has done it" does not mean "this man alone has done it," but "this man alone, among all the active causes and factors, is legally responsible for the deed."
>
> In the division of the return from production, we have to deal similarly...with…an imputation, – save that it is from the economic, not the judicial point of view. [Wieser 1889, 76-79]

The task of property theory is the opposite—to deal with an imputation, save that it is from the judicial, not the "economic" point of view. The original non-metaphorical judicial notions of imputation and responsibility are used in property theory.

The property theoretic question is not about "distributive shares"; it is about who appropriates the whole product.[16] Since Labor is responsible for producing (Q,–K,0) but only appropriates

[15] This provides the modern reconstruction of the old slogan: "Labour's claim to the whole product" put forward by the "band" of classical laborists such as Thomas Hodgskin and William Thompson. For the history of that school, see Anton Menger [1899] and particularly the Introduction by Foxwell [1899] as well as Lowenthal [1972] and Stark [1943].

(0,0,L) in the employment system, Labor is responsible for but does not appropriate the difference which is the whole product:

$$(Q,–K,0) – (0,0,L) = (Q,–K,–L).$$

The legal party who has the contractual role of being the last buyer of all the inputs consumed in production would "swallow" the input liabilities –K and –L and thus would have the legally defensible claim on the outputs Q. In this manner, the employer would legally appropriate the whole product (Q,–K,–L) independently of owning the assets yielding K and independently of any de facto responsible actions—which would, in any case, be included in L. Since Labor was de facto responsible for the whole product, the responsibility principle was violated by the employer's appropriation of the whole product.

Analysis of the Employment Contract

Since "Not-Locke implies Not-Hume," the violation of the responsibility principle in production under the employment relation means that there must have been some violation of the no-externality or no-breach conditions in the sphere of exchange.

It is the no-breach condition that is violated by the employment contract. The basic fact that connects the contractual mechanism and the imputation mechanism is that things can, in fact, be transferred from the factual possession and control of one party to another. Person A might rent a van (i.e., sell some of the van's services) to another person B. To fulfill the contract, the van would be factually transferred from A to B so that B can then use the van (i.e., use up the van services) independently of A and be solely de facto responsible for the results obtained by using up the services of the van. The contractual mechanism functions correctly when legal title to those services stays coordinated with the factual possession and use of the services. Then the legal imputation of the Invisible Judge to B for using up the van's services according to the last-buyer contract will be in accordance with de facto responsibility of B for the use of those services.

But this mechanism breaks down when person A (an "employee") tries to rent his or her self (i.e., sells his or her own services) to person B (the "employer"). There is no voluntary action to fulfill an employment contract so that the employer can "employ" the employee and be solely de facto responsible for the "employment" of those services. What actually happens to "fulfill" the employment contract is that the employee agrees to co-operate with the employer in a certain activity. But there is no voluntary transfer of de facto responsibility. Both the employee and the working employer are jointly de facto responsible for the fruits of their joint activity.

When the legal authorities accept (NB: "accept" in the *laissez faire* sense of taking no action) the de facto responsible co-operation of the employee as "fulfilling" the labor contract for the sale of labor services from the employee to the employer, then the Invisible Judge mistakenly imputes all the legal responsibility to the employer for the using up of the "input" labor services and for the other positive and negative fruits of their joint activity.

---

[16] The appendix shows how the vectorial treatment of marginal productivity theory integrates it with the vectorial treatment of property appropriation without the distributive shares metaphor that is misleading about the structure of rights.

The legal authorities take no action to declare that the employees are "non-responsible" or to declare that the employer is solely de facto responsible for the positive and negative product of the joint activity. And that is just the point; an Invisible Hand mechanism works by non-action. The mis-imputation of the Invisible Judge is based simply on the legal authorities not rejecting the employees' responsible co-operation as "fulfilling" the legal transfer so that there seems to be no externality or breach to give grounds for intervention.

The underlying facts of workers' de facto responsibility are not controversial. This is easily seen by considering the rather different reaction of the legal authorities when the employer and employee, or "master and servant" in the old-speak of agency law, co-operate together in the commission of a crime. The servant in work becomes the partner in crime.

> All who participate in a crime with a guilty intent are liable to punishment. A master and servant who so participate in a crime are liable criminally, not because they are master and servant, but because they jointly carried out a criminal venture and are both criminous. [Batt 1967, 612]

When the venture being "jointly carried out" is non-criminous, the workers do not suddenly become non-persons or automatons being "employed" by the employer. The facts about de facto responsible co-operation remain the same. It is the reaction of the legal system that changes when no legal wrong is recognized. Then the Invisible Judge rules "let it be" and the contractual pattern imputes the whole product to the employer.

Of course, a contract involving a crime is null and void. But the worker is not de facto responsible for the crime because he made an illegal contract. The employee is de facto responsible because the employee, together with the employer, committed the crime (not because of the legal status of the contract). It was his de facto responsibility for carrying out a "criminal venture" which gave the legal authorities grounds to intervene and set aside the contract. In the previous example, if person B went off and committed a crime with the van and if A, the owner of the van, had no personal involvement (aside from being the person hiring out the van), then person A, the seller of the van's services, would have no de facto responsibility for B's employment of those services and there would be no reason to invalidate the van rental contract.

The meaning of "immobility" depends on the "space" being considered. In trade theory, land and its services are immobile factors in geographical space. People and capital, in contrast, move about in geographical or physical space. But when it is said, for example, that a house was transferred into the possession of the buyer, then the house is transferred in what we might call "possession space" while it stays immobile in physical space. It is people who are the fixed coordinates in possession space; people and their services cannot be transferred in possession space.[17] When people move in physical space to occupy a house or a factory, then it is the house or factory that move in possession space to the people using it. The fact that human action is

[17] This applies only to the voluntary actions of people. A person can be physically coerced and thus not be de facto responsible for the results of that coercion. Hence involuntary "actions" are factually transferred in possession space but, unless otherwise stated, our concern is with normal voluntary actions. Here again, Marx went down a completely different road by arguing that wage labor was "coerced" labor.

never factually transferred between persons was rather dimly noted by Marshall as the "second peculiarity" that the seller of labor "must deliver it himself." [1961, 566]

Instead of the factual transfer of labor services between parties, there is only de facto responsible co-operation. In terms of the contractual machinery, the employment contract is impossible to actually fulfill with the transfer of responsible actions from the seller (employee) to the buyer (employer). Thus the employment contract systematically violates Hume's conditions by being inherently breached. In what might be taken as a fraud on an institutional scale, the responsible co-operation of the "employees" is taken by the legal authorities as "fulfilling" (i.e., not breaching) the labor contract which allows the employer to take the contractual position of the whole product appropriator. That is the basic trick in the employment system of renting human beings. Since the contract for renting people is impossible to fulfill, it is invalid on grounds of impossibility.

If the modest proposal were accepted that the contract for the renting of human beings be recognized as invalid, then production could only be organized on the basis of the people working in production (jointly) hiring or already owning the capital and other inputs they use in production. Then the Invisible Judge would correctly impute the legal responsibility to the de facto responsible party. The legal members of the firm as a legal party would be the people working in the firm.[18] Such a firm is a *democratic firm* and the private property market economy of such firms is an *economic democracy*.[19]

Summary

There were a number of small *gestalt* changes in framework, mini-paradigm shifts, that were necessary before the ideas developed here could fall together. In conclusion, some of those shifts are mentioned.

1. <u>Fundamental myth</u>: The idea that the "rights to the product" are part and parcel of the rights to some existing asset is easily defeated by considering the case where the asset is rented out. Then the product goes elsewhere while the ownership of the asset remains in the same hands. This shows that "being a firm" (i.e., whole product appropriator) is a contractual role. Then avoiding the semantic shifts between "capital" (as owned assets) and "capital*" (owned assets plus non-owned contractual role of whole product appropriator) will clear the path to moving beyond the fundamental myth.

2. <u>Appropriation</u>: If the rights to the product are not part of some pre-existing property rights, then the ground is cleared to raise the question of appropriation in normal production, not just in some mythical state of nature or when common property is being privately appropriated.

---

[18] It was noted previously that when employer and employees engage in a crime and the legal authorities intervene to explicitly make the imputation in accordance with the responsibility principle, then the "business" is reconstituted as a "partnership" of all the people involved. Since the facts about de facto responsibility are unchanged when the business is non-criminous, it might be said that the people working in an enterprise should always be "treated as criminals" by setting aside the employment contract and legally reconstituting the business as a partnership.

[19] See, for example, Dahl 1985. The best examples today are probably the Mondragon industrial cooperatives in the Basque region of Spain [see Oakeshott 1978, 2000; Ellerman 1984; or Lutz 1999]. Employee ownership schemes and codetermination arrangements are steps in the same direction.

3. Vectorial treatment: By "vectorial treatment," I mean not just thinking in multi-dimensional terms but in algebraically symmetrical terms about "positives" and "negatives," i.e., assets and liabilities. This allows the symmetrical treatment of both ends of the life-cycle of a property right, initiation and termination, as being the appropriation of property assets and liabilities. Moreover it shows that consumption is also a site for appropriation since property rights are terminated in consumption (as well as in production).

4. Whole product: The conventional approach is dominated by the "distributive shares" metaphor, as if the suppliers of the inputs were producers and claimants on shares of the *positive product* (Q,0,0). There is also a dual metaphor about the demanders of outputs using up the inputs and thus having shares in the *negative product* (0,–K,–L) as claims against them. The dual metaphor tells a "story" about marginal cost pricing of outputs just as the usual "story" leads to the marginal productivity costing of inputs. But these metaphors duel only with each other. There is in fact no legal imputation of the positive product to the input suppliers and no imputation of the negative product to the output demanders. Instead, the whole product (positive plus negative products) is legally imputed to one legal party, the party who would thereby be called the "firm." This reconceptualization of production changes the focus of normative questions from "distributive shares" to the basic question of "Who is to be the firm?".

5. Invisible judge: All four of the previous points come together to arrive at the formulation of the market mechanism of appropriation. This idea could not arise without the mini-paradigm shifts of getting beyond the fundamental myth, raising the question of appropriation, seeing appropriation in a two-sided vectorial fashion, and moving beyond the metaphorical picture of imputation in the firm (from distributive shares to the whole product). Then the idea quickly arises of a last-buyer/first-seller invisible hand mechanism of imputation by the "lowest court in the land," the Invisible Judge.

6. Responsibility: One of the astonishing feats, or, rather, feints of conventional economics is the learned ignorance of the fact that while all the inputs are causally efficacious, only human action ("labor") can be de facto responsible and that the responsibility for using productive instruments is imputed back through the instruments to the human users. The basic reasons for the professional blindness are not hard to fathom; today's unnatural system of property and contract based on the renting of human beings, the "employment system," legally treats labor services *as if* they were "non-responsible" (outside of crimes) and transferable like the services of things.

7. Responsibility principle: One of the key connections to bring the pieces of the puzzle together was the realization that the "fruits of one's labor" principle from Lockean property theory was the positive application of the normal juridical principle of responsibility typically applied to the negative side of appropriation, the imputation of liabilities.[20]

---

[20] Independently of Ellerman [1980, 1985, 1992], this connection has been noted by a legal scholar: "[T]he libertarian entitlement thesis, to the effect that persons are entitled to retain the fruits of their labor, and the libertarian thesis about outcome-responsibility, to the effect that persons are responsible for the harms that they cause, are two sides of the same coin. ... The basis of this unity is the idea that people "own" the effects, both good and bad, that causally flow from their actions." [Perry 1997, 352] Actually the connection was, in effect, made over a century ago in orthodox apologetics. John Bates Clark [1899] constructed an interpretation of marginal

8. Possession space: A focus on what happens when contracts for the purchase and sale of commodities are fulfilled and on property externalities quickly shows that the relevant transfers are not in physical space (although that may be involved), but transfers in possession. Similarly, the relevant "immobile" or "non-tradable" factors would be what cannot in fact be voluntarily transferred out of the possession of a person, i.e., a person's de facto responsibility.

9. Fundamental theorem: One part of the theorem was seeing that putting the juridical principle together with the idea of possession space pointed out that the de facto responsible party for consuming or producing a commodity would also be, respectively, the last or first possessor of the commodity. That, in turn, established the connections to the contracts fulfilled by transfers in possession. Hence when all contracts are fulfilled and there are no extra-contractual transfers, then the last-buyer/first-seller imputation of the Invisible Judge will be respectively to the last/first possessor and thus correct in terms of the responsibility principle, i.e., the Hume-implies-Locke fundamental theorem.

10. Analysis and critique of employment system: With the above pieces in place, the analysis and critique of the current system based on the renting of human beings is straightforward. Labor produces Labor's product (Q,–K,0), which is the sum of the de facto responsible actions conceived as a "commodity" (0,0,L) plus the whole product (Q,–K,–L), but Labor only appropriates (as first seller) the "labor commodity" while the employer appropriates the whole product.[21] The "trick" at the basis of the employment system was for the legal authorities to not intervene in the employment relation when no crime was committed so that the de facto responsible co-operation of the employees with the employer would "count" as fulfilling the contract for the transfer of labor and the *laissez faire* mechanism of appropriation would do the rest. Thus the employees are paid for their labor, and the employer appropriates the whole product even though Labor was de facto responsible for producing it.

The interesting implication is that, notwithstanding two centuries of economic theorizing, the current system is not the "natural system of property and contract" any more than would be a private property system where longer-term voluntary contracts in human capital (e.g., self-sale or voluntary slavery contracts) were legally valid. The natural system is one where the "owner-operated" proprietorship and family farm generalize to democratic firms of any size where people are jointly working for themselves. Moreover, the system of economic democracy finally resolves the long-standing conflict between being a voting citizen bearing inalienable rights in the political sphere and being a rented "employee" in the workplace.

---

productivity theory using metaphorical Lockean language that became part of orthodoxy, e.g., "The basic postulate on which the argument rests is the ethical proposition than an individual deserves what is produced by the resources he owns." [Friedman 1962, 196] Wieser [1889]constructed a metaphorical interpretation MP theory using the language of imputation and the responsibility principle. Since both schemes build metaphorical interpretations of the same MP theory (where all resources are treated as "responsible" for the product that was "produced by the resources"), the connection between Lockean entitlement and juridical imputation was there all along in orthodox apologetics.

[21] Here again, Marx missed developing the beginnings of the labor theory of property in Hodgskin, Thompson, Proudhon, and others while obsessing on the rather hopeless "labor theory of value."

Appendix: Vectorial Treatment of Marginal Productivity Theory

How is this treatment of property rights fit with the "distributive shares" reasoning of marginal productivity theory? One line of reasoning in the past was that if labor was the only de facto responsible factor, then the labor L would be responsible for the integral of the marginal productivity of labor from 0 to L:

$$\int_0^L \frac{\partial f}{\partial L} d\ell = f(K,L) - f(K,0) = Q.$$

But that would leave no accounting for the other factor (input liabilities) so the conventional line of reasoning was to see each factor as being marginally "responsible" for a "distributive share" of the product. Then the focus switched to the so-called "problem of distributive shares" (including the "adding-up problem").

The flaw in this reasoning, aside from the switch to the metaphorical notion of "responsibility," is the scalar notion of marginal productivity. The explicit or implicit interpretation of the scalar marginal productivity as the product of the marginal unit never made sense because production would also involve using up other inputs. Labor cannot produce $\partial f/\partial L$ *ex nihilo*.[22] Marginal productivity should be a vector and the least cost assumption requires that the derivatives be taken along the least cost expansion path. Then the marginal products are vectors $\mathbf{MP_L}$ and $\mathbf{MP_K}$ where profit maximization implies that the values of the marginal products equal the factor prices

$$(p,r,0)\mathbf{MP_L} = w \quad \text{and} \quad (p,0,w)\mathbf{MP_K} = r.$$

With a Cobb-Douglas production function, $Q = AK^aL^b$ (but a+b is not assumed to be one), the vectorial marginal products are derived by taking derivatives along the least cost expansion path where K/L = wa/br. The *marginal product of labor* is the vector:

$$\mathbf{MP_L} = \left((a+b)A\left(\frac{aw}{br}\right)^a L^{a+b-1}, \quad -\frac{aw}{br}, \quad 0 \right).$$

Since labor is the only responsible factor, one can compute its responsibility for the positive and negative results of production by "adding up"[23] or integrating its vector marginal product from 0 to L to obtain the result—which is Labor's product (Q,–K,0) = (Q,–K,–L) + (0,0,L) = Whole product + labor:

[22] See Chapter 5 "Are Marginal Products Created *ex Nihilo*?" in Ellerman [1995].

[23] This is the "Adding Up Theorem" that resolves the non-metaphorical "adding up problem"—the problem of giving an account of "who is responsible for what" in production so that the marginal results add up to the total results of production.

$$\int_0^L \mathbf{MP}_L \, d\ell = \int_0^L \left((a+b)A\left(\frac{aw}{br}\right)^a \ell^{a+b-1}, -\frac{aw}{br}, 0 \right) d\ell = \left(\left. A\left(\frac{aw}{br}\right)^a \ell^{a+b} \right]_0^L, \left. -\frac{aw}{br}\ell \right]_0^L, 0 \right)$$

$$= \left(A\left(\frac{aw}{br}\right)^a L^{a+b}, -\frac{aw}{br}L, 0 \right) = (Q, -K, 0) = \text{Labor's product.}$$

Hence when marginal productivity is formulated in terms of marginal variations along the least cost expansion path—instead of notional variations off that path—then the adding up of the marginal products of the responsible factor does give the total responsibility which includes the liabilities (–K) for the other inputs.

The similar formal calculation could be performed for the non-human inputs K but it would have no non-metaphorical significance since, as the legal system recognizes, the services of animals or things are not de facto responsible no matter how causally efficacious they might be. Only human actions can be de facto responsible, including being responsible for using up the services of things as part of production (i.e., the –K in Labor's product). Things are like perfect conductors (not sources) of responsibility so responsibility is imputed back through things to the human users.

References

Barnett, Randy 1986. A Consent Theory of Contract. *Columbia Law Review.* 86(2): 269-321.

Barzel, Yoram 1989. *Economic Analysis of Property Rights*. New York: Cambridge University Press.

Batt, Francis 1967. *The Law of Master and Servant*. London: Pitman.

Black, H. 1968. *Black's Law Dictionary*. St. Paul: West Publishing.

Clark, John Bates 1899. *The Distribution of Wealth*. New York: Macmillan.

Coase, Ronald 1960. The Problem of Social Cost. *Journal of Law and Economics.* 3: 1-44.

Cooter, Robert and Thomas Ulen 2004. *Law and Economics*. Fourth ed. Boston: Pearson Addison-Wesley.

Dahl, Robert 1985. *Preface to Economic Democracy*. Berkeley: University of California Press.

Demsetz, Harold 1967. Toward a Theory of Property Rights. *American Economic Review*. Vol. 57 (May 1967), 347-359.

Dworkin, Ronald 1985. *A Matter of Principle*. Cambridge: Harvard University Press.

Ellerman, David 1980. Property Theory and Orthodox Economics. In *Growth, Profits and Property: Essays in the Revival of Political Economy.* Ed. by E. J. Nell. Cambridge: Cambridge University Press: 250-263.

Ellerman, David 1984. Entrepreneurship in the Mondragon Cooperatives. *Review of Social Economy.* XLII (December 1984): 272-294.

Ellerman, David 1985. On the Labor Theory of Property. *Philosophical Forum.* XVI(Summer 1985): 293-326.

Ellerman, David 1992. *Property & Contract in Economics: The Case for Economic Democracy*. Cambridge: Blackwell. [Out-of-print with rights reverted to the author so the full text is available at: www.ellerman.org]

Ellerman, David 1995. *Intellectual Trespassing as a Way of Life: Essays in Philosophy, Economics, and Mathematics*. Lanham MD: Rowman & Littlefield.

Ellerman, David 2004. *On a Difficulty in Welfare Economics: The Reversibility of the "Efficiency" and "Equity" Distinction in the Marshall-Pigou-Kaldor-Hicks Tradition of Non-Paretian Welfare Economics*. Working paper. 20 pages. See: www.ellerman.org

Fama, E. and M. Jensen 1996. Organizational Forms and Investment Decisions. In *The Economic Nature of the Firm*. Second edition. L. Putterman and R. Kroszner, Eds. Cambridge, Cambridge University Press**:** 336-344.

Fleming, Wendell 1977. *Functions of Several Variables*. New York: Springer-Verlag.

Foxwell, H. S. 1899. Introduction. In *The Right to the Whole Produce of Labour.* by A. Menger. London: MacMillan: v-cx.

Friedman, David D. 2000. *Law's Order: What Economics has to do with Law and why it matters*. Princeton: Princeton University Press.

Friedman, Milton 1962. *Price Theory*. Chicago: Aldine.

Furubotn, E. and S. Pejovich, Eds. 1974. *The Economics of Property Rights*. Cambridge: Ballinger Publishing Company.

Furubotn, Eirik and Rudolf Richter 1998. *Institutions and Economic Theory: The Contributions of the New Institutional Economics*. Ann Arbor: University of Michigan.

Gierke, Otto von 1958. *Political Theories of the Middle Age.* Tr. F. Maitland. Boston: Beacon.

Graff, J. de V. 1967. *Theoretical Welfare Economics*. Cambridge: Cambridge University Press.

Haavelmo, T. 1960. *A Study in the Theory of Investment.* Chicago: University of Chicago Press.

Hart, O. and J. Moore 1990. Property Rights and the Nature of the Firm. *Journal of Political Economy.* 98: 1119-59.

Hirshleifer, J. 1970. *Investment, Interest, and Capital.* Englewood Cliffs: Prentice-Hall.

Holmstrom, B. and J. Tirole 1989. The Theory of the Firm. In *Handbook of Industrial Organization Vol. I*. R. Schmalensee and R. Willig Eds. Amsterdam, North-Holland**:** 61-133.

Hume, David 1978 (1739). *A Treatise of Human Nature*. Oxford: Oxford University Press.

Kelsen, Hans 1985. Causality and Imputation. In *Lloyd's Introduction to Jurisprudence.* Ed. by L. Lloyd and M. D. A. Freeman. London: Stevens & Sons: 362-365.

Locke, John 1960 (1690). *Two Treatises of Government*. New York: New American Library.

Lowenthal, Esther 1972 [orig. 1911]. *The Ricardian Socialists*. Clifton NJ: Augustus Kelley.

Lutz, Mark 1999. *Economics for the Common Good*. London: Routledge.

Maitland, F.W. 1960. *Frederic William Maitland: Historian*. R.L. Schuyler ed. Berkeley: University of California Press.

Marx, Karl 1967 (1867). *Capital: A Critique of Political Economy. Volume I*. S. Moore and E. Aveling trans. New York: International Publishers.

Menger, Anton 1899. *The Right to the Whole Produce of Labour: The Origin and Development of the Theory of Labour's Claim to the Whole Product of Industry.* Trans. M.E. Tanner. Intro. by Herbert S. Foxwell. London: Macmillan and Co (Reprinted by Augustus Kelley).

Miceli, Thomas J. 1999. Property. In *The Elgar Companion to Law and Economics.* Ed. by J. Backhaus. Cheltenham UK: Edward Elgar: 121-35.

Montias, J. M. 1976. *The Structure of Economic Systems.* New Haven: Yale University Press.

Oakeshott, Robert 1978. *The Case for Workers' Co-ops*. London: Routledge and Kegan Paul.

Oakeshott, Robert 2000. *Jobs and Fairness: The Logic and Experience of Employee Ownership*. Norwich UK: Michael Russell.

Perry, Stephen 1997. Libertarianism, Entitlement, and Responsibility. *Philosophy & Public Affairs.* 26(4, Fall): 351-96.

Putterman, L. 1996. Ownership and the nature of the firm. In *The Economic Nature of the Firm*. L. Putterman and R. Kroszner Eds. Cambridge, Cambridge University Press**:** 361-369.

Putterman, L. and R. S. Kroszner, Eds. 1996. *The Economic Nature of the Firm*. 2nd edition. Cambridge: Cambridge University Press.

Rockafellar, R.T. 1984. *Network Flows and Monotropic Optimization*. New York: John Wiley.

Stark, W. 1943. *The Ideal Foundations of Economic Thought*. London: Routledge & Kegan Paul.

Samuelson, Paul A. 1976. *Economics.* (10th ed.) New York: McGraw-Hill.

Umbeck, John 1981. Might Makes Right: A Theory of the Formation and Initial Distribution of Property Rights. *Economic Inquiry*. Vol. 19 (1), 38-59.

Wieser, Friedrich von 1889. *Natural Value.* Trans. by C.A. Malloch and published in 1930. New York: G.E. Stechert and Company.