

*The Fundamental Interrelationships Between
Government and Property*

*Edited by Nicholas Mercuro and Warren J. Samuels
Michigan State University*

*This book was undertaken under the auspices of:
Professor Stuart Nagel
Policy Studies Organization, University of Illinois*

*In memory to our colleague and friend Walter Adams
... someone who did not treat the subject of this volume lightly
and uncritically...*



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PROPERTY APPROPRIATION AND THEORY OF THE FIRM

David Ellerman

WHAT ARE THE QUESTIONS?

In some fields of intellectual inquiry, it is the questions that are difficult, not the answers. Once the questions are well-formulated, the answers might be quite straightforward. Questions involve assumptions and a conceptual framework. Much of the work in developing a theory—such as a theory of the firm—is in building up the conceptual framework to pose the right questions.

What are the questions that a "theory of the firm" is supposed to answer? Many theories of the firm are aimed at answering vastly different questions, so the theories do not give competing answers to the same question; they provide different answers to different questions. I will approach the theory of the firm from the viewpoint of a positive, descriptive property theory. A positive property theory describes how property rights are initiated, transferred, and terminated in a private property market economy.

The usual "economic" approach to the firm is to emphasize cost minimization or, more generally, allocative efficiency.¹ "The main hypothesis is that contractual designs, both implicit and explicit, are created to minimize transaction costs between specialized factors of production" (Holmstrom and Tirole 1989, p. 63). While this economic approach has its domain of applicability, it operates within a framework of mechanisms for the initiation and termination of property rights and for the transfer of property rights. That framework is our topic.

THE LIFE-CYCLE OF A PROPERTY RIGHT

A positive theory of property for a private property market economy should describe how property rights are created or initiated, how they are transferred from party to party, and finally how property rights are terminated.

Property rights are created in firms and households, and property rights are also terminated by firms and households. In between is the market where property rights are transferred. The instrument for transferring property rights is the voluntary contract which is fulfilled by the transfer of the *de facto* possession and control of the property from the old owner to the new owner (usually in exchange for other property going in the opposite direction).

Theory of Appropriation

While it is well-known that property rights are transferred by voluntary contract, the question remains—what is the legal means by which property rights are initiated and terminated in a private property market economy? It will be helpful to first establish some notation and terminology. Consider a simplified description of a productive opportunity $Q = f(K,L)$ where the outputs Q are produced by applying the labor L to the capital services or non-labor inputs K .² The initiation of a property right is called the “appropriation” of the property right. Symmetrically the termination of a property right might be called the “expropriation” of the property right but that word has now been corrupted to mean the forced transfer or “taking” of property by the state.³ The word “expropriation” can be avoided by referring to the “expropriation of the assets X ” as the “appropriation of the liabilities $-X$.”

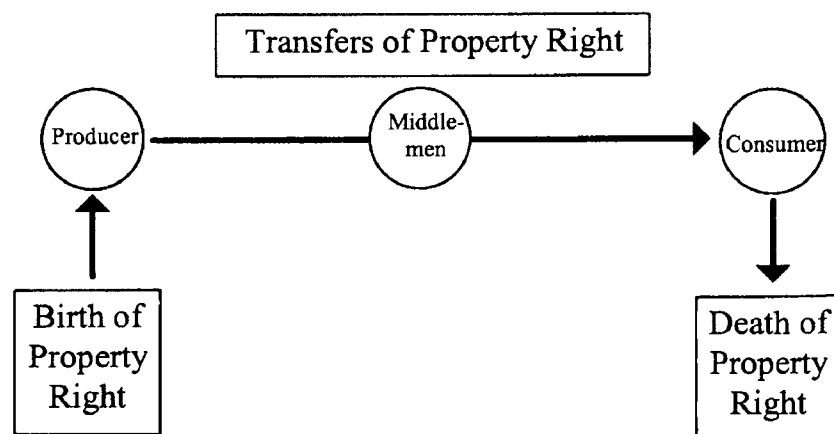


Figure 1. “Life-Cycle” of a Property Right

In the productive opportunity $Q = f(K,L)$, the property rights to Q are initiated and the property rights to K and L are terminated so this could be described as the appropriation of the assets Q as well as the appropriation of the liabilities $-K$ and $-L$. It will be useful to adopt a simple vector notation with three components representing outputs, non-labor inputs, and labor inputs respectively. Thus the vector of outputs or assets appropriated in production is $(Q,0,0)$ and it will be called the “positive product.” The vector of liabilities (signifying the used-up inputs) appropriated in production is $(0,-K,-L)$ and it will be called the “negative product.” Summing the positive and negative products component-wise gives vector of assets and liabilities appropriated in the productive opportunity $(Q,-K,-L)$ which I will call the “whole product.”

$$\begin{aligned}
 &\text{Positive Product} = (Q,0,0) \\
 &+ \text{Negative Product} = (0,-K,-L) \\
 &= \text{Whole Product} = (Q,-K,-L)
 \end{aligned}$$

The “whole product” is simply a property-theoretic name for the production vector familiar to economists in the production set treatment of production where the outputs are listed positively and the inputs are listed negatively.⁴

How does a private property market economy determine who appropriates the whole product? There is a “laissez-faire” or market mechanism of appropriation. Better known is the alternative non-market assignment of liabilities by the legal authorities which takes place in a trial for property damages when the defendant is found guilty and held liable for some property that was destroyed. To understand the market mechanism, one must consider who would appropriate the liability $-X$ (i.e., terminate the property right to X) if the property X is used-up, consumed, or otherwise destroyed when the legal authorities do *not* intervene (i.e., the laissez-faire case). In that case, the liabilities $-X$ are borne by the last legal owner of X . Thus one could say that in the absence of any state intervention to reassign liabilities such as a trial for damages, the liabilities $-X$ for used-up or destroyed property X is assigned by the “invisible judge” (the juridical version of the “invisible hand”) to the last legal owner of X .

Any new property created in the process of using up the old property would be assigned by the “invisible judge” to the same legal party who bore the liabilities for the used-up property since that party in the absence of any reassignment of the liabilities would have the defensible legal claim on the produced property if the case were brought before a (visible) judge.

Market Mechanism of Appropriation: Let the liabilities for the used up inputs lay where they have fallen (i.e., in the hands of the last owner of the inputs), and then let that party have the claim on any produced outputs.

It should be noted that this mechanism of appropriation only works for produced outputs as opposed, for example, to gifts of nature.

In terms of our example, the last legal owner of the non-labor inputs K and labor inputs L would laissez-faire appropriate the negative product $(0, -K, -L)$. In the absence of any state intervention to reassign those liabilities, that same party would have the defensible legal claim on the positive product $(Q, 0, 0)$. Putting the two products together, one has the market mechanism for the appropriation of the whole product $(Q, -K, -L)$. The legal party who appropriates the whole product of a productive opportunity will be called the "firm" (with respect to that opportunity). Since that party would pay for the liabilities $-K$ and $-L$ and receive the revenue from the outputs Q , the whole product appropriator is also called the "residual claimant."

THE FUNDAMENTAL MYTH ABOUT PROPERTY RIGHTS

The "market mechanism of appropriation" might all seem like a fancy way to restate the obvious, but it has quite strong implications. For instance, it shows that in order for a legal party to be the "firm" with respect to a given productive opportunity, it is sufficient for the party to be the last legal owner of all the inputs used up in the production process. Then that party has the defensible legal claim on the outputs that emerge in production so that party would appropriate the whole product. Since it is the fact-pattern of the input contracts (e.g., whether capital hires labor or labor hires capital) that determines who is the last legal owner of the used-up inputs, the identity of the "firm" (= whole product appropriator) is contractually determined. There is no need for the legal party to additionally "buy" or "own" the production function or production set. There is no such thing as the "ownership" of a production function or production set in a private property market economy. It is not by the "ownership" of a production set that whole product vectors are assigned to legal parties but by the market mechanism of appropriation.

The idea that there is a property right (variously called "ownership of the firm," "ownership of the production function," "ownership of the productive opportunity" and so forth) which determines which party legally appropriates the whole product of a productive opportunity is such a pervasive and important idea that it will be called the *Fundamental Myth about property rights*. An understanding of the Fundamental Myth is important to our argument because if it is thought that the whole product is already owned by the "owner of the firm" then the entire question of appropriation (initiation and termination of property rights) in production is not even formulated. The question of appropriation in production is not well-formulated in the law and economics literature. For example in the Putterman and Kroszner anthology (1996) on the "economic" nature of the firm, none of the papers pose the question of appropriation in their treatment of the firm. The question of appropriation in the firm is similarly ignored in the "economics of property rights" (e.g., Furubotn and Pejovich 1974) and in the so-called "property rights

approach" to the firm (e.g., Hart and Moore 1990; Hart 1995). Any discussion of the appropriation or initiation of property rights is ordinarily relegated to a rather mythical original state of nature [e.g., in the philosophical literature] or to a situation where unowned international resources are being privatized. For instance, Harold Demsetz (1967) considers how private property in land with fur-bearing animals was established as a result of growth in the fur trade. John Umbeck (1981) considers how gold rights were established in the 1848 California gold rush on land recently ceded from Mexico. Yoram Barzel (1989) considers how minerals under the North Sea were privatized. But in Barzel's book (see particularly Chapter 5 "The Formation of Rights," 1989) as elsewhere in the economics of property rights literature, there is no recognition that the appropriation of the outputs (and the symmetrical appropriation of liabilities for the used-up inputs) takes place in normal production.

Only the conversion from unowned property to private property is considered in the law and economics literature; the question of appropriation when private property is used up in the production of other private property is not considered. Thus the question of appropriation at the heart of the theory of the firm is not even posed in the "economics" literature on property rights and the firm. This illustrates our opening remark that in some fields it is the questions that are difficult. Once the question of appropriation is asked, the descriptive answer of the market mechanism of appropriation is relatively straightforward.

"OWNERSHIP OF A FIRM" AND OWNERSHIP OF A CORPORATION

What are the origins of the Fundamental Myth that firmhood is established by an ownership right ("ownership of the firm") rather than by the contractual status of being the last legal owner of all the inputs to production? Perhaps the most common origin is a misinterpretation of the "ownership of a corporation." Before turning to that, it might be noted that economists use the notion of "ownership of the firm" in more general contexts independent of corporations. In an abstract model, entrepreneurs are "bidding for ownership of the firms" (Hirshleifer 1970, p. 124) and become the "owners of the productive opportunity" (p. 125). A proprietor may sell "the rights to the transformation function" or "his rights to the venture" (Fama and Jensen 1996, p. 341) to another proprietor. The entrepreneur is the "owner of a production function" (Haavelmo 1960, p. 210). There is no corporate law in Crusoe, but Robinson Crusoe nonetheless "owns the firm" (Varian 1984, p. 225).

The most common or "standard" origin of the "ownership of a firm" notion is to (mis)interpret the ownership of a corporation that is currently undertaking a production opportunity $Q = f(K, L)$ (by virtue of its contractual position) as being "ownership" of the productive opportunity. But this interpretation can be easily defeated by changing the contractual position of the corporation without changing

its ownership. For instance, if the capital services K were hired out rather than the labor services L being hired in, then the “firm” in the sense of whole product appropriator would shift but the ownership of the corporation would be in the same hands. The role of the corporation would shift from being the firm (with respect to that opportunity) to being an input supplier to the firm.

This argument might be better understood by considering a productive opportunity both outside and inside a corporate form. Consider a simplified process where the labor L is applied using the services K of a widget-maker machine in order to produce the widgets Q during each time period. If the machine is owned by an individual, then it is clear that the person could hire in the labor L and produce Q —or could hire out the services K to another party. The pattern of contracts determine whether the individual operates as the firm (with respect to that opportunity) or as an input supplier to the firm. Now suppose that the individual incorporates a company and issues all the stock to himself in return for the machine. This legal repackaging changes nothing in the market logic of the argument that separated capital ownership from residual claimancy. The corporation (rather than the individual) would own the widget-maker machine and, depending on the direction of the hiring contracts, may or may not appropriate the whole product of the productive opportunity using the widget-maker. The process of incorporation does not miraculously transubstantiate the ownership of a capital asset into the ownership of the whole product vectors that might be produced using the capital asset.

In realistic markets, there are likely to be large transaction costs to rearranging the input contracts. The incumbent corporate residual claimant has sizable

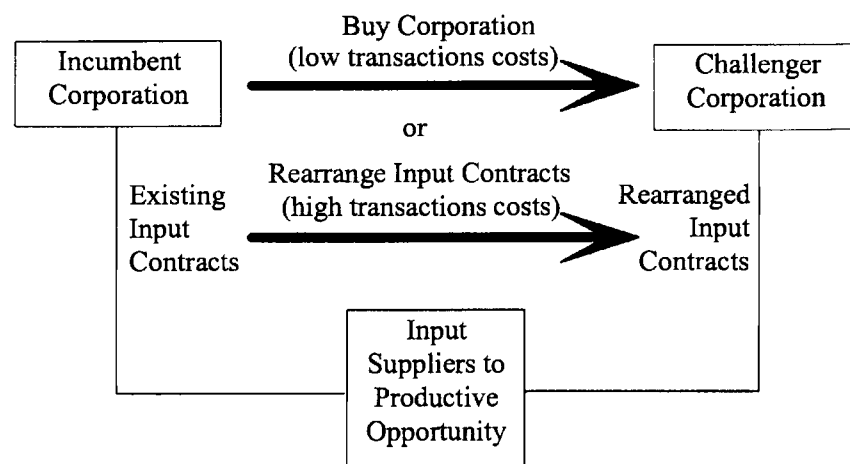


Figure 2. Two Ways to Take Over a Production Opportunity and thus “Become the Firm”

first-mover advantages so that any challenging party would have to incur such high transaction costs to redirect the input contracts that it might be just as cheap or cheaper to simply buy the corporation and thereby take over the residual claimant’s position in the existing pattern of input contracts. These transaction cost barriers create the image that the existing corporate residual claimant “owns” the production opportunity.

One of the advantages of idealized frictionless models in economics, as in physics, is that they show the basic logic of the system without irrelevant distractions. In a world without transaction costs, the input contracts could be costlessly rearranged to switch residual claimancy from one party to another without changing the ownership of a corporation from one party to another. That shows the underlying logic of the contractual determination of residual claimancy in a private property market economy.

The transaction cost barriers to rearranging contracts in real-world markets create the illusion of a property right such as the everyday notion of “ownership of the firm.” Transaction cost barriers are only that; they are not property rights. For instance, as transaction costs change it might become more feasible to acquire residual claimancy by rearranging input contracts rather than by purchasing the corporation. This would not violate the corporation’s “ownership of the production set” since it had no such property right in the first place.⁵

THE FUNDAMENTAL MYTH IN CAPITAL THEORY

The Fundamental Myth has an important role in many parts of conventional economics. I will only touch on its role in capital theory and corporate finance theory. One of the simplest forms of the Fundamental Myth is the assumption that the bundle of rights that constitute ownership of an asset includes “a right of ownership-over-the-asset’s-products, or *jus fruendi*” (Montias 1976, p. 116) or simply “the right to the products of the asset” (Putterman 1996, p. 361). The ambiguous *jus fruendi* expressions are innocuous if the “products of the asset” such as the aforementioned widget-maker asset are just the services K . But the expressions involve the Fundamental Myth if the “products of the asset” includes the product Q .

A similar error occurs routinely in capital theory with the notion of “returns to a capital asset.” A capital asset is used *passively* when it is sold or rented out in return for some market price or rental. An asset is used “*actively*” when, instead of being evaluated directly on the market, it is used up in production, usually along with other resources. Then the liabilities for the used-up resources and the rights to any produced assets are appropriated. Appropriation by the asset owner is involved in the active case, not in the passive case. Difficulties arise in the usual treatment of the active case, since economic theory tends to ignore appropriation. The economic return in the active case is not just the value of the original resource but the extra value of the appropriated property. But the total return in the active

case is mistakenly imputed only to the original resource, *as if* the ownership of the appropriated property were already included in ownership of the original resource. That version of the Fundamental Myth pervades orthodox capital theory and is then carried over to corporate finance theory (viewing a corporation as a complex machine). Property which is appropriated cannot be previously owned; otherwise it could not be appropriated. The extra value of the appropriated property (e.g., the whole product) is not a return to the original resource. In the context of the market appropriation mechanism, it is a return to the contractual role of being the hiring party, the last legal owner of the used-up resources.

Suppose that the widget-maker machine yields K units of machine services per year for n years and then has no scrap value. The asset owner has the property right to the stream of capital services K or, in vectorial terms, $(0, K, 0)$ each year for n years. But if the asset owner also has the contractual role of the firm or residual claimant in that production opportunity for the n years, then that party will additionally appropriate the whole products $(Q, -K, -L)$ which sum for the stream of net ownership vectors $(Q, 0, -L)$ for n years (the first row plus the second row equals the bottom row in the following Table 1).

Orthodox capital theory then discounts the value of the net vectors $(Q, 0, -L)$ (bottom row in Table 1) back to the present to arrive as the “capitalized value of the asset” as if the right to the whole products (second row) had been part of the ownership of the assets. But the appropriation of the whole products is contingent on a certain contractual fact-pattern, and it is not a violation of the ownership rights of the asset owner to have the asset hired out instead of labor being hired in. Thus the value of the whole products (“profits”) might or might not go to the asset owner depending on the future pattern of the input contracts. The so-called “capitalized value of the asset” is actually the value of the asset (discounted value of the $(0, K, 0)$ stream in the first row) plus the discounted value of the stream of whole products (discounted value of the $(Q, -K, -L)$ stream in the second row)—where the latter may or may not accrue to the asset owner.

Table 1.

| | Year 1 | Year 2 | ... | Year n |
|---|-----------------|-----------------|-----|-----------------|
| Property vector owned by asset owner. | $(0, K, 0)$ | $(0, K, 0)$ | ... | $(0, K, 0)$ |
| Property vector appropriated by last owner of inputs (residual claimant). | $+ (Q, -K, -L)$ | $+ (Q, -K, -L)$ | ... | $+ (Q, -K, -L)$ |
| Net property vector accruing to asset owner who is <i>also</i> the residual claimant. | $= (Q, 0, -L)$ | $= (Q, 0, -L)$ | ... | $= (Q, 0, -L)$ |

When a man buys an investment or capital-asset, he purchases the right to the series of prospective returns, which he expects to obtain from selling its output, after deducting the running expenses of obtaining that output, during the life of the asset (Keynes 1936, p. 135).

This is incorrect. In fact one thereby purchases only the asset. Any further return will depend on one’s contracts. If one rents out the asset, then one receives only the rental income stream. If, instead, one hires in labor, bears the costs of the used-up labor and capital services, and claims and sells the outputs, then one receives the net proceeds mentioned by Keynes. In each case, one owned the asset. The difference lies in the pattern of the subsequent contracts. By making the contracts so that one was the hiring party, one could additionally appropriate the whole product each time period with its positive or negative value. The capitalized value definition fallaciously imputes the value of the appropriated whole products *to the capital assets* rather than to the contractual role played by the capital owner.

Capital theory is conceptually flawed at its root.

All potential income must be capitalized. That is to say, we start with institutional property rights. Each income account “belongs” to some “person” (Samuelson 1937, p. 477).

Property *appropriated* in the future may have a present capitalized value but it does not have a present owner.

THE FUNDAMENTAL MYTH IN CORPORATE FINANCE THEORY

There is no legal necessity that the owner of the machine be the residual claimant (with respect to, say, the widget making process), and the same holds when the owner is a corporation. Yet corporate finance theory carries over the same capital-theoretic mistake of interpreting the whole product as part of corporate ownership. For instance, the discounted cash flow method of valuation routinely assigns to the corporation the present value of the net cash flows (e.g., from $(Q, 0, -L)$ on the bottom row of the table) from production rather than the present value of the cash flows from the services of the underlying corporate assets (e.g., from $(0, K, 0)$ on the top row).

There, in valuing any specific machine we discount at the market rate of interest the stream of cash receipts generated by the machine; plus any scrap or terminal value of the machine; and minus the stream of cash outlays for direct labor, materials, repairs, and capital additions. The same approach, of course, can also be applied to the firm as a whole which may be thought of in this context as simply a large, composite machine (Miller and Modigliani 1961, p. 415).

But in order to plausibly count the future whole products as part of the present property rights of the corporation, all the future input contracts would have to be made in favor of the corporation at the present time. Moreover, since contracts are generally not enforceable until one side performs, the corporation would have to

have paid all future input contracts at the present time in order to have a present property claim on all future products produced by those inputs. Since those conditions would hardly be fulfilled, the usual discounted cash flow method of valuation does not value the property rights “of the corporation.” It values the underlying assets of the corporation plus the additional value that would accrue to the corporation *if* it had the contractual role of residual claimant throughout the projected future time periods. Since the usual corporate valuation formulas count the corporation as already owning that which is not pre-owned (future whole products), corporate finance theory shares the same root flaw as capital theory.

GOVERNMENT’S ROLE IN THE PRESENT PROPERTY SYSTEM

While our focus is on positive property theory, this understanding of actual property rights directly determines the relevant questions for normative analysis. For instance, the defenders and the Marxist critics of “capitalist production” all agreed that the rights to the product were part of the rights of capital ownership, and then they disagreed about whether those rights of capital should be privately or publicly owned. We saw that their common presumption was mistaken; the product rights are not a part of “ownership of the means of production.”

Since the product rights are not a pre-owned part of the rights of capital, we saw that the product is appropriated via a market mechanism of appropriation. That in turn raises the normative question about the norms of property appropriation (e.g., the old idea that people ought to appropriate the fruits of their labor). Since the market mechanism of appropriation is based on the pattern of inputs contracts (i.e., on who is the last legal owner of the used-up inputs), that focuses normative attention on the specific contract that prevents people from legally appropriating the fruits of their labor, namely the employer-employee contract. That employment contract is the short-term version of the life-time labor contract or self-enslavement contract. The Fundamental Theorem of Welfare Economics (“A competitive equilibrium is Pareto optimal”) requires full future markets in all commodities including labor (see Debreu 1959) so the basic efficiency theorem requires that the self-enslavement contract be legally allowed.

Now it is time to state the conditions under which private property and free contract will lead to an optimal allocation of resources....The institution of private property and free contract as we know it is modified to permit individuals to sell or mortgage their persons in return for present and/or future benefits (Christ 1975, p. 334).

Yet the government interferes in the free market and prevents these “optimal” conditions from holding since the voluntary slavery contract was abolished along with involuntary slavery—in spite of the long history of the voluntary self-enslavement contract (see Ellerman 1995, chap. 3). When the self-sale con-

tract was legally permitted, social power may well have determined “who buys who and on what terms.” But the resolution of the problem did not lie in better market regulation or in making these markets more competitive. The resolution was to abolish those markets.

The short-term contract for the hiring or renting of people is however still considered legally valid in today’s market economies. The basic contribution of the government to the present property system is the legal validation of the employment contract for the hiring or renting of human beings. We have seen how property appropriation depends on the pattern of contracts and how the violation of the traditional norm of people appropriating the fruits of the labor is based on the employment contract. Without the employment contract, we would have a rather different private property market economy based on people always being jointly self-employed in democratic self-managed companies.

Signing a contract to alienate self-government in an otherwise democratic workplace would not be an option just as selling one’s vote is not an option in a democratic living community—in spite of the long history of the Hobbesian contract to alienate the rights of self-government (see Ellerman 1992, chap. 7). The “equity rights” in a democratic company would be attached to the working-members of the company, so there would be no “equity capital” just as there is no “equity capital” in a democratic town, city, or state. The people working in a company would legally appropriate, via the market mechanism of appropriation, the positive and negative fruits of their labor. The key to the present property system lies not in the market mechanism for appropriation but in the legal validation of the employment contract.

The “free market” where all contracts between consenting adults are legally valid is only a fantasy supported by economists’ learned ignorance of the doctrine of inalienable rights, a doctrine that descends from the Reformation and Enlightenment (see Ellerman 1992, chap. 9). Voluntary lifetime labor contracts as well as Hobbesian non-democratic constitutions are now outlawed, but the contract for renting people is still permitted.

Since slavery was abolished, human earning power is forbidden by law to be capitalized. A man is not even free to sell himself: he must *rent* himself at a wage” (Samuelson 1976, p. 52).

That is the basic contribution of the government to this specific form of private property market economy.

NOTES

1. For an excellent anthology exclusively on the “economic” analysis of the firm, see Putterman and Kroszner (1996).
2. Many different types of labor and non-labor inputs could be considered but that would only complicate the notation and would not change the underlying logic.

3. "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, p. 692, entry under "Expropriation").

4. The production vector is also called a "production possibility vector" (Arrow and Debreu 1954, p. 267), an "activity vector" (Arrow and Hahn 1971, p. 59), a "production" (Debreu 1959, p. 38), an "input-output vector" (Quirk and Saposnik 1968, p. 27), or a "net output vector" (Varian 1984, p. 8). Marginal productivity theory can also be developed using vectorial product notions such as "marginal whole product of labor" and the like (see Ellerman 1995, chap. 5).

5. While the lay misinterpretation of ownership of a corporation might be understandable in a world of significant transactions costs, it is less clear why economists should still be wedded to the lay concept in the "standard model" of general equilibrium in an idealized world free of transaction costs. For instance, the fabled attempt by Arrow and Debreu (1954) to show the existence of a competitive equilibrium with positive "pure profits which are distributed to the owners of the firm" (Arrow 1971, p. 70) is flawed *in theory* because they incorrectly assume there is the ownership of production sets in a private property market economy. To pinpoint the error in their mathematical formulation, the problem is not in assuming corporate ownership, that is, that the *i*th consumer owns "a contractual claim to the share a_{ij} of the profit of the j^{th} production unit" (Arrow and Debreu 1954, p. 270) where "production unit" is a corporation. The error is the assumption that for "each production unit *j*, there is a set Y_j of possible production plans" (p. 267) and that this corporation is the only party allowed to bid on the inputs for that production opportunity. The ownership of a corporation is misinterpreted as the ownership of a production set even in the idealized frictionless model where a challenger corporation could bid slightly higher for the inputs (and get lower but still positive profits) to take over a production opportunity and thus defeat the purported "competitive equilibrium" with positive pure profits.

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