Economic Calculation and the Role of Prices in Privatization

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How do private property rights come into being, and what factors explain why privatization efforts are more effective in some contexts than others? Demsetz (1964, 1967, 2002) argues that property rights will be established when the costs of privatizing a resource fall below the expected gains from privatization (or, conversely, when the gains from privatization rise above the costs). Although his conclusion sparked ample debate, the essential features of his argument have been generally accepted (Anderson and Hill 1975; Umbeck 1977; Hornbeck 2010).

Insights from the socialist calculation debate, however, complicate Demsetz's account. Mises ([1920] 2008, [1936] 1981, 1948) argues that economic calculation (profit-and-loss accounting) relies on the prior existence of markets with well-defined property rights. This poses a puzzle: if private property is a *prerequisite* for economic calculation, as Mises argues, then how can economic agents calculate whether or not to establish property rights in the way that Demsetz suggests?

There is an obvious solution to this apparent tension. Mises himself points out that calculation is necessary for economizing in advanced industrial economies, but

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not in *every* context. Primitive barter economies are not sophisticated enough to need money prices. In such settings, calculation (profit-and-loss accounting) is not necessary for economizing (moving resources from lower-valued to higher-valued uses).

What is interesting to us, however, are the implications of this insight for assessing the costs of privatization in *advanced* economies. Our core contention, building on both Mises and Demsetz, is that assessing these costs is far more difficult in "incomplete markets," where property rights are either absent or poorly enforced, than in "complete markets," where they are clearly defined and enforced. We should therefore expect privatization efforts to be more successful in more advanced, well-functioning markets than in nonmarket settings. For example, we should expect privatization to be far more effective in more market-oriented economies like post–Warsaw Pact Poland than in more command economies, like that of the Soviet perestroika.

Piano and Rouanet (2018) distinguish calculation about the decision to privatize from profit-and-loss accounting. *Primary calculation* refers to traditional profit-and-loss accounting that takes place in complete markets on the basis of money prices (what Mises calls "monetary calculation"). *Secondary calculation*, in contrast, refers to calculating whether to establish property rights or to rely on markets in the first place, particularly in the context of incomplete markets. We argue that the decision to privatize in Demsetz's account is a product of *secondary* calculation. We then show that understanding Demsetz's theory as a case of secondary calculation can help explain why privatization is more effective in complete markets than incomplete ones, allowing us to better predict when privatization efforts will succeed or fail.

Our work contributes to two literatures. First, we add to the economics of property rights literature that seeks to understand the emergence, nature, and function of property rights (e.g., Coase 1937, 1960; Demsetz 1964, 1967, 2002; Alchian and Demsetz 1972; Anderson and Hill 1975; Umbeck 1977; Barzel 1997; Beaulier and Prychitko 2006; High 2009; Hornbeck 2010). Second, by developing a novel application of Piano and Rouanet's (2018) concept of secondary calculation, we add to the Austrian literature on economic calculation (e.g., Mises [1920] 2008, 1948; Hayek [1935] 2000, 1937, 1945; Rothbard [1962] 2009, 1976, 1991; Lavoie [1985a] 2015, [1985b] 2016; Klein 1996; Boettke 1998). In our view, the property rights literature has not fully taken into account the way that alternative property regimes structure the knowledge that is available in a society, with most of this discussion being limited to the Austrian literature on calculation. Our goal in this paper is to synthesize the Austrian and property rights literatures in the hopes that property rights scholars will gain a greater appreciation for the relationship between epistemics and private property.

This paper proceeds as follows: First, we briefly summarize Demsetz's theory and the core arguments from the socialist calculation debate. Then we offer a synthesis of the property rights and Austrian calculation literature by identifying Demsetz's theory as a case of secondary calculation. Finally, we illustrate our argument with some examples.

Property Rights and Economic Calculation

Demsetz's Theory of Property Rights

Demsetz's (1964) observation that it is costly to establish and maintain property rights carried radical implications for contemporary discussions of how property rights emerged. We use the term *property rights* to refer specifically to *economic* property rights as identified by Barzel ([1997] 2013, 2015). These are distinct from *legal* property rights. Economic rights consist in de facto control of a resource; legal rights consist in de jure control and public recognition, often by the state, of a person's entitlement to such control. In contemporary Western democracies, legal rights (e.g., a title to a piece of land) tend to correspond to economic rights (e.g., the ability to rent the land to a farmer), but such a state of affairs need not obtain. In some developing countries, land titles often do not reflect who has real control of the asset.

Property rights are economic goods, in the sense that privatizing a resource is costly. There are costs to signaling to others that a good belongs to someone, and there are costs to keeping others from stealing the good. Property rights must thus be produced. Indeed, Demsetz argues that, just like any other good, property rights are produced to the extent that the marginal benefit of privatization equals the marginal cost.

Demsetz (1967) attempts to generalize his earlier work to provide a more detailed explanation of the origins not only of individual property right claims but also of markets more generally. He subsequently writes of his paper, "Whereas Coase's work examined the consequences that followed from an existing private-ownership system, I sought to explain why such a system would come into existence" (Demsetz 2002, S655). Briefly, property rights are established when their benefits exceed their costs: "Increased internalization, in the main, results from changes in economic values, changes which stem from the development of new technology and the opening of new markets, changes to which old property rights are poorly attuned" (Demsetz 1967, 350). In other words, property rights are established when the costs from privatizing a resource fall below the prospective gains or, equivalently, when the benefits of privatizing rise above the costs. For Demsetz, the primary benefit of novel property rights is the elimination or reduction of externalities (though he is careful to note that laws need not be consciously adjusted with a view toward externalities in order to have this general effect).

Demsetz explains the sudden emergence of land ownership among the Montagnais in Quebec by appealing to the value of furs. Exposure to European demand caused the value of furs to rise, meaning both that more people (French and Native) engaged in hunting and that the external cost of hunting—the loss suffered by later hunters who missed out on game—rose. The costs of privatizing fell below the gains from privatization as the price of fur rose and the promise of internalizing these costs grew more attractive. Thus, property rights were established. The exact mechanism

by which their emergence occurs is left ambiguous; the historical record is unclear whether land privatization occurred by force or agreement.

Demsetz's theory has been widely accepted and extended by other authors in the decades since its publication. Pejovich (1972) endorses and attempts to generalize Demsetz's argument, suggesting that feudal arrangements in medieval Europe were the result of a similar property rights calculus. Anderson and Hill (1975) find that all kinds of property rights on the American frontier—land, water, livestock—were defined and enforced as a result of this Demsetzian cost/benefit analysis. Umbeck (1977) applies a similar argument to explain the proliferation of mining claims in the absence of state government during the California gold rush. Hornbeck (2010) argues that effective land privatization in the American West occurred because the costs of cattle encroachment on farmland rose higher than the cost of investing in barbed-wire fences.

Austrians on Economic Calculation and Property Rights

Mises ([1920] 2008, [1936] 1981, 1948) argues that engaging in rational economic calculation under socialism is impossible—that is, central planners cannot solve the fundamental problem of efficiently allocating the economy's scarce resources. The problem according to Mises is epistemic: without market prices in capital goods, planners cannot know the relative scarcities of inputs. There are numerous technically feasible ways to accomplish a given end, but the planners cannot know which of the possible are economical. Platinum may be as serviceable as steel for the manufacture of railroad tracks, but in market economies, railroads use steel because economic actors can refer to money price signals to see that platinum is relatively expensive. In socialist economies where the economy is essentially a single firm, inputs have no prices, so there can be no profit-and-loss accounting in factor markets; planners cannot determine whether platinum or steel is more expensive. Without the ability to compare revenues with costs, planners cannot rationally calculate the values of alternative uses of capital goods. In other words, without market prices, it is impossible to economize in production.

Lavoie (1985a, 1985b) later clarified that only when prices emerge from the competitive bidding of buyers and sellers over privately owned goods do they accurately reflect the resource's underlying scarcity. Under socialism, "because no producer good will ever become the object of exchange, it will be impossible to determine its monetary value" (Mises [1920] 2008, 4). Private property is therefore necessary for engaging in rational economic calculation.[1]

1. We define a market as any network of exchanges. Private property—the right to sell one's control over a good—is the institution that facilitates these exchanges. Note that societies may develop robust markets for some goods (e.g., land) but not others (e.g., kidneys). Note further that markets, broadly construed, may contain nonmarket institutions within them. For instance, a firm, wherein resources are allocated by managerial fiat and not exchange, exists within a broader network of exchanges—the firm ultimately purchases inputs and sells outputs.

It is important to distinguish between calculation and economizing. All people at all times and places can (and do) economize on their use of scarce resources. Calculation, or the ex ante prediction and ex post measurement of profit-and-loss, is an aid to economizing that is capable of reaching its full potential only in a market economy where goods have money prices. By definition, rational economic calculation requires money prices. In sufficiently advanced economies, economizing requires calculation.[2]

Although Demsetz was long a skeptic of the calculation arguments advanced by Mises—and by Hayek ([1935] 2000, 1937, 1945)—later in his career he professedly came to appreciate certain aspects of their approach. However, he downplayed their epistemic significance, insisting that the real value of private property lay in coordinating incentives, not in generating and transmitting knowledge: "The problem is not knowledge acquisition per se but motives to marshal and use particular kinds of information" (Demsetz 2002, S664).

Synthesizing Demsetz and the Austrian Approach to Property Rights

Economic Calculation and the Role of Prices in Privatization

The Austrian literature on economic calculation has, until recently, only cursorily discussed the relationship between the costs of establishing property rights and economic calculation. Notable contributions include those of Rothbard (in 1962 and 1976), both explicitly invoking Coase (1937). The Austrians emphasized that the advantage of using the price system is economic calculation or, more precisely, the knowledge that calculation affords. Klein (1996) argues that the Austrian insight is that the knowledge afforded by calculation is an economic good that serves as a boundary condition for the size of the firm. In Klein's Coasean argument, a producer creates more calculability by drawing down the size of his firm. It is not costless to rely on markets to produce every input: some inputs are better made internally. The marginal benefit of shrinking a firm is the improved knowledge of asset values that arise from their being exchanged; the marginal cost is the transaction costs of relying on markets.

The Coasean-Austrian synthesis on the theory of the firm finds that firm size is mutually determined by the perceived value of that knowledge and the perceived (transaction) costs of acquiring it (Rothbard 1976; Klein 1996; Piano and Rouanet 2018). The theory of transaction costs as a whole, however, has been largely divorced from the Austrian theory of economic calculation.

2. Mises points out that prices do not capture a good's subjective use-value. What they do is give the owner of a good a clearly defined opportunity cost of continuing to derive subjective use-value from the good. A price tells the owner what she forgoes in continuing to own the good.

Piano and Rouanet (2018) have taken the first major steps at synthesizing these two literatures. They distinguish two levels of economic calculation: primary and secondary. *Primary calculation* is simply profit-and-loss accounting. It broadly coincides with Mises's notion of "monetary calculation" and what the Austrians have hitherto called "economic calculation." Primary calculation occurs in the context of "complete markets" where property rights are well defined and all relevant assets are priced; in this setting, economic agents can engage in calculation that is guided "entirely by market-price signals" (3).

Secondary calculation, in contrast, refers to the decision about whether to establish property rights or rely on markets at any step in the production process. To borrow an example from Piano and Rouanet, a chair producer must not only use primary calculation to decide what type of wood to use for their chairs. They must also engage in secondary calculation to decide whether to vertically integrate the production of that wood. The latter decision is inevitably informed by the expected cost of establishing and maintaining property rights over producing this wood internally versus simply relying on markets in order to purchase it from outside firms. Unlike primary calculation, secondary calculation does not require complete markets where all relevant assets are priced. It can and often does take place in incomplete markets where property rights are poorly defined. In short, secondary calculation refers to the decision about whether to rely on primary calculation in the first place. To quote Piano and Rouanet:

> The domain of the price mechanism is not given to economic agents from above but is the result of the rivalrous market process. The precise limits of this domain will be determined by what we refer to as "secondary calculation." (3)[3]

To put the point concretely, consider an example: The owner of a company must decide whether employees are allowed to smoke in the office (which he also owns). Permitting smoking is costly to nonsmokers, who would prefer not to smell cigarettes. Forbidding smoking is costly to smokers, who would prefer to be able to smoke at their desks. Under zero transaction costs, the owner-employer could let employees bargain over the right to smoke. Nonsmokers would pay smokers to abstain from smoking, or smokers, if they valued their ability to smoke more than nonsmokers valued a smoke-free workplace, would pay the nonsmokers for the right to smoke. But suppose that transaction costs are prohibitive—perhaps there is a free-riding problem, and so sufficient funds cannot be pooled to induce a change in behavior. A market for smoking rights will not emerge. But because the employer is situated as the owner of private property in a broader market context, he will not

3. As Piano and Rouanet note, their analysis of primary and secondary calculations dovetails nicely with Leeson and Boettke's framework of "two-tiered entrepreneurship." Leeson and Boettke (2009) argue that entrepreneurship operates on two levels: the allocation of resources within a given institutional framework, and the establishment of private governance institutions to overcome the possibility of private predation.

be left without guidance as to how to regulate office smoking. For instance, if he chooses to permit smoking, he will have to compensate nonsmokers, say, in the form of a higher wage, in order to attract them to his workplace.

The least costly solution might just be to build a wall and maintain designated smoking and nonsmoking sections, but it might not. The key point is that, in a world where primary calculation is possible, the producer *also* receives feedback about how to define and enforce private property rights. Every solution to the smoking problem—letting the employees contract among themselves, compensating nonsmokers in wages, building a wall, etc.—impacts the firm's bottom line. The producer can thus make reasonable decisions about alternative property regimes and receive feedback for those decisions in the form of market prices. Secondary calculation, in contrast, consists in deciding which of a set of alternative property regimes to adopt. It takes place in *incomplete* markets where most if not all of the relevant assets are not necessarily priced. By its very nature, calculation is more difficult because the decision-maker does not have access to direct and clear-cut feedback in the form of market price signals. Other examples include the regulation of infectious diseases, where the question is whether to let potential communicants bargain over disease-related externalities or to regulate behavior (see Leeson and Rouanet 2021; Leeson and Thompson 2023).[4]

The paradigmatic case of secondary calculation is the Coasean make-or-buy decision. The firm cannot directly observe changes in net revenue that result from choosing to suppress the market price system by allocating more resources within the firm. Primary calculation provides direct feedback from a decision. The feedback from secondary calculation, however, is indirect. Firms can know, through primary calculation, whether they have earned positive accounting profits. Secondary calculation provides no comparable revenue statements or profit and loss signals that firms can rely on to communicate the extent and direction of alternative making-versus-buying arrangements.

The knowledge afforded by primary calculation is an *economic* good, in the sense that it is costly to acquire. Secondary calculation is calculation about how much and what kind of primary calculation is worth having. There is thus a recursive relationship between the two modes of calculation. Primary calculation tells the producer whether he has added or destroyed value through his production decisions. Secondary calculation tells him how much primary calculation he should rely on. But the only way an entrepreneur can know whether he has, in fact, created value by rearranging his array of purchasing and producing inputs is by examining his bottom line—that is, by engaging in primary calculation. This is the sense in which the feedback for secondary calculation is recursive and indirect. The producer relies on secondary calculation to determine how much primary calculation is available, but then uses primary calculation to assess whether his decision was value-added.

4. See also Mulligan (2023) on the private regulation of externalities where bargaining is prohibitively costly.

One way—we might say the Austrian way—of interpreting Coase is like this: *secondary* calculation reveals the optimal level of ignorance about asset values. If the costs of transacting in spot markets are zero, then all assets will be priced and all laborers will be independent contractors. Because using spot markets incurs transaction costs, there is an optimal level of ignorance about the value of inputs for a given output. Firms rely on financial tools like stock prices and accounting statements to determine their profitability, as opposed to measuring the market price of each of their capital goods or negotiating wage contracts daily. These are indirect forms of feedback, in the sense that a stock price or accounting statement does not tell the owner of the firm the marginal products of any of his capital. Purchasing more and producing fewer inputs means, however, that the producer need not meter the output of as many capital goods. The more production the producer actually has to do, the more marginal products of inputs he must assess. The make-or-buy decision is a decision about how much metering the producer will have to do. Secondary calculation consists in the indirect feedback about the decision of how much metering is necessary.

As Piano and Rouanet conclude, "It must be that the decision to price or not to price is the product of an intentional decision by entrepreneurs responding to relative transaction costs constraints. To appraise those constraints . . . entrepreneurs must have access to what we call secondary calculation" (346). They use this point to formulate Mises ([1920] 2008) more precisely: socialism fails because it precludes the possibility of *both* primary and secondary calculations. There is an optimum firm size, but the complete absence of markets makes it impossible to calculate the value of even using the price system. Prices bear valuable knowledge. Revealing this knowledge requires costly firm disintegration. Actors can decide whether to integrate by using secondary calculation. If, however, it is insisted a priori that the optimal number of firms is one—that is, that all firms should integrate—then there can be no meaningful prices for factors of production. This implies that not only can socialist producers not assess the relative values of inputs, but that further, they cannot assess transaction costs associated with disintegration. Decision-makers under socialism have recourse to neither primary nor secondary calculation (because it is assumed that secondary calculation is unnecessary).

Demsetz's Theory as a Case of Secondary Calculation

Piano and Rouanet apply their synthesis of the calculation and transaction costs theories to firm theory and political economy, but express their hope that it will bear fruit in other fields, such as law and economics (346). We share this hope. To this end, we argue the decision to privatize that Demsetz describes is in fact the product of Piano and Rouanet's secondary calculation.[5]

5. It is worth noting that Demsetz had some reservations about the meaning of transaction costs and the concept's applicability to the analysis of property rights. Allen (1991) argues that transaction costs are

The Montagnais responded to the contact with European markets for furs, which motivated the decision to demarcate land. In the extensions of Demsetz's analysis in the literature, privatizers always have access to market *prices* that signal the value of the communal good as well as the costs of establishing and enforcing its private ownership (e.g., Hornbeck's 2010 analysis of land claims and Umbeck's 1977 analysis of gold mine claims). If there are no prices by which to measure the costs and benefits of privatizing, the decision to privatize must be uninformed—the actor does not have the knowledge necessary to economize (except in primitive cases, which of course are what Demsetz was mainly interested in). Essential to most cases of the creation of new property rights, then, is the capacity for the privatizer to evaluate the benefits and costs of privatization. In other words, a Demsetzian privatizer in an advanced economy must be able to perform *secondary calculation*.

In the case of secondary calculation, the value of new property rights—or of reducing property rights through firm integration—is not initially reflected on the bottom line. Feedback to privatization decisions must itself be indirect, in the same way that feedback about the marginal productivities of inputs is always indirect. The entrepreneur knows from his bottom line whether he has created or destroyed economic value, but he cannot directly infer from his bottom line in what way the different components of his productive process have contributed to that bottom line. Analogously, a producer who (dis)integrates his firm may observe a change in his bottom line in consequence, but he cannot directly attribute any changes in his accounting profits entirely to his decision to change the distribution of property rights.

For example, an electrician might decide to purchase copper that has already been transformed into wires. Instead of purchasing raw copper, the producer purchases rather than produces wires, which gives him more direct feedback about the value of his production process. He observes both the price of wires (his *input*) and, say, the installation of wiring in a house (his *output*). Since his only addition to the wires is his labor installing them, he now can infer the marginal product of his process. The value added by his labor is the difference between the price of wires and the price he charges for his services. Contrast this to the case of the electrician who purchases raw copper, then transforms the copper into wires himself, before finally selling his services installing copper wires. This second electrician must do more metering since he performs multiple processes in-house. He has costs—the raw copper—and he can compare his revenue to his costs, but he cannot by simple observation determine what proportion of his revenue is generated by his transformation of copper into wires and what proportion is generated by his transformation of wires into wiring. The first electrician thus has *more direct feedback* as a result of his choosing to purchase rather than produce his inputs. The decision to make or buy is, in this sense, a decision about whether to have more or less direct feedback.

just "the resources used to establish and maintain property rights." Allen (2000) argues that Demsetz's de facto operationalization of the term falls in line with his own definition.

What makes the decision tricky for the producer is that he is not indifferent to the choice between making or buying wires, for all the reasons discussed above. He earns different amounts of profit depending on whether he chooses to make or buy. Secondary calculation is calculation about such a decision. Secondary calculation is still a rational means of economizing, a kind of calculation, because the decision-maker has the capacity to assess the costs of privatizing ex ante. The Montagnais' decision to privatize per se yields no new revenue; their wealth increases only when the new mode of organization yields a directly monetizable productive advantage (more furs). Thus, the decision to privatize in a monetary economy is in this respect a kind of secondary calculation.

It is worth noting here that Demsetz should be forgiven for denying the epistemic role of property described by Mises and Hayek. The motive for the Montagnais is not the new knowledge that can be had by creating land rights for hunting, but rather that a commons problem can be solved. The value of privatization, in this case, consists in the elimination of external costs. The notable advantage of property rights comes from shifting incentives away from overhunting. New knowledge borne by prices on previously unpriced goods need not factor into the decision (though new knowledge, e.g., of the value of certain land parcels, is undoubtedly generated by the decision).

This recognition augments Piano and Rouanet's work. Secondary calculation consists in the appraisal of alternative property regimes, but their costs are not merely weighed against the value of knowledge—they are also weighed against the value of altered incentive structures. As long as a market exists, decision-makers can and do include judgments of the value of knowledge as well as the value of altered incentives in their decisions to privatize, integrate, or perform any action requiring secondary calculation. When conceived in these terms, economic calculation is an extraordinarily powerful analytical tool. Appraising the costs of property regimes involves evaluating gains from new knowledge as well as gains from improved incentive structures, and either one or the other may be of paramount importance in a particular case. This approach highlights the commonality between Coase's earlier (1937) and later (1960) works. The problem of social cost is evaluated in the same way as the problem of firm size: costs are assessed and weighed against the value of establishing property rights. The value of establishing property rights is, however, assessed on two margins, either of which may hold primacy in a particular case.

Implications for Privatization

Application to Historical Cases of Economies in Transition

It follows from the foregoing argument that attempts to define and enforce novel private property rights are more likely to increase efficiency if they are undertaken in a market context where economic agents face a constellation of money prices

for relevant goods and services. However, in a number of cases of privatization in advanced economies, the requisite constellation of money prices has been absent or significantly suppressed.

Perhaps the most notable example is the post-Soviet experience in Eastern Europe. Our argument suggests one reason why the post-Soviet transition seems to have been so unsatisfying. In addition to the incentive problems that the elites face when asked to alter their distributional coalitions, they must also overcome a knowledge problem in transitioning to an economy of well-defined and well-enforced private property rights. Our argument suggests, in other words, that we can better understand the unsatisfying post-Soviet transition by merging the insights from the Austrian and property rights approaches: it is impossible to calculate the costs of privatizing in the absence of private property rights. The net benefits costs associated with alternative property regimes or privatization strategies are initially unobservable, and feedback is initially absent.

To revisit our earlier smoking example, the owner of a firm can assess the different costs associated with building interior walls versus paying higher wages to compensate nonsmokers. A transitioning government, however, does not have access to market prices and thus cannot identify the relative costs associated with, say, equally distributing or auctioning shares of companies, or bundling different plots of land and/or capital together. There is some efficient way for a company to deal with smoking. With secondary calculation, producers can identify the optimal solution. (Even if mistakes are made in the short run, we should expect long-run convergence to the efficient equilibrium as mistakes impact the bottom line [Alchian 1950].) There is similarly some optimal way to privatize previously collectivized resources, but without secondary calculation, privatizers cannot be expected to identify the optimal privatization pattern.

This observation helps explain why privatization efforts thrived in some formerly centrally planned economies and languished in others (Boettke 1993). Baltic states (like Estonia and Lithuania) that opened their economies to international trade and adopted bold market-oriented reforms by selling off state-owned assets to "new entrants" (workers and managers with the skills to become market entrepreneurs) rather than government officials and political cronies, for instance, experienced more rapid growth rates after the collapse of the Soviet Union; nations that enacted only tepid privatization efforts and handed off state-owned assets to oligarchs and former Communist officials, in contrast, foundered (Mitra and Selowsky 2002). In the former case, new entrants and entrepreneurs had access to market prices and other guideposts to help them engage in secondary calculation. In the latter case, these signals were still largely absent; without reliable market prices, newfangled owners had little more ability to economize and engage in secondary calculation than the planners before them.

One of the starkest examples comes from Poland's experience with privatization after the collapse of the Soviet Union. It has been well documented that Poland privatized more quickly and effectively than many other states in the collapsing

Warsaw Pact, and certainly more than Russia. It has also been well documented that, in important respects, Poland's experience of Soviet socialism was less complete than Russia's. The abolition of private property in Poland under the Soviet regime, for instance, was less severe than elsewhere in the Soviet Union. Agriculture remained partially privatized throughout Warsaw Pact Poland. In 1944, agricultural collectivization began, but by 1949, state-run farms constituted only about 10 percent of all farmland (Boettke et al. 2023, 17); 1956 reforms officially permitted private farming. Additionally, small private retail enterprises, as well as small-scale manufacturing and crafts, were permitted to operate even at the height of collectivization (Kozminski 1997). Contrast this modicum of private property to early Russian socialism, which was near total and included a deliberate hyperinflation to destroy monetary exchange and undo the division of labor entirely (Boettke 1990). The Polish experience was far from a market economy, but also far from pure Bolshevism.

Our preceding arguments suggest that this distinction might account for some of the discrepancy between Poland's successful privatization and Russia's comparatively lackluster one. A cottage industry of commentary on the Russian experience finds that Russian privatization was characterized by a depressingly high level of rent seeking (Sachs 1992; Boettke 1993; Boycko et al. 1993; Black et al. 2000). What is interesting, however, is that Poland seemed to experience at least as much rent seeking in its own privatization of state-owned enterprises (Sachs 1992; Rondinelli and Yurkiewicz 1996). Poland succeeded not on account of its successful privatization of state-owned enterprises, but because entrepreneurship surged, particularly in sectors of the economy that were not dominated or controlled by state-owned enterprises. That is, privatization of what had been collectivized was possibly as lackluster in Poland as in Russia, but new enterprises and investments were made at much, much higher rates in Poland.

Our framework speaks directly to this discrepancy. The presence of some well-defined property rights would not necessarily appreciably reduce rent seeking. But it would lower the cost of defining new property rights, thereby making it easier for entrepreneurs to start enterprises and attract the sort of investment capital necessary to grow these new ventures. Investments to establish functioning private capital markets need not be as large where some private ownership is already well documented and enforced. Polish shopkeepers and farmers can make investments to expand enterprises that they already hold, and use their existing property as collateral to secure financing. What's more, they can form reasonable expectations about the benefits and costs of increasing or decreasing the size and integration of their firms. Our arguments here suggest that, though still subject to entrepreneurial error, these expectations would almost certainly be more reasonably informed than those of their Soviet counterparts, who lacked access to this wider constellation of property rights and market prices. The higher level of baseline privatization in Poland therefore rendered its prices more informative and constructive than those in Russia.

Additionally, Frye (2004) shows that where investment did occur in Russia, it was only in those comparatively few areas where local businesspersons trusted courts to make a fair ruling in legal actions where the state was a litigant. A higher level of preexisting privatization in Poland should not necessarily lead us to expect that state courts in Poland will be fairer. But it does mean that Polish entrepreneurs should need to litigate less often. That fact alone means that the establishment and enforcement of new property rights—over newly created capital and new businesses, as well as over expansions and integrations of existing businesses—should be less costly.

Application to Postcolonial Kenya

These observations are not limited to the post-Soviet experience. They can also be applied to better understand the failure of numerous privatization efforts in other parts of the world. Postcolonial Africa, for instance, provides another interesting case study. Leeson and Harris (2018) show that the introduction of private property rights in Kenya was "wealth-destroying." (See also Leeson et al. 2021.) They find that "wealth-destroying private land rights in Kajiado were created by property decision-makers who were not residual claimants and whom land privatization benefited personally" (1). In this case, property rights were defined in a way that destroyed wealth because the relevant decision-makers faced perverse incentives. We want to both lend nuance to and reinforce Leeson and Harris's point by drawing attention to another source of wealth destruction: namely, privatization undertaken when the costs and benefits of privatization are not assessable.

Leeson and Harris (2018) theorize that property rights are likely to be wealth destructive when created by decision-makers who lack residual claimancy. They write:

> While the consequences for social wealth of privatizing an asset currently found in the commons depends on whether the asset's privatization confers net gains or imposes net losses on society, the decision to privatize the asset depends on whether its privatization confers net gains or imposes net losses on the people who have authority to make property decisions relating to it—the property decision makers. (2)

Where the person in charge of defining and enforcing property rights lacks the residual claim, he does not internalize all of the costs and benefits of his decision. Thus, his decision will likely impose negative externalities on those who live under the new property regime. Where privatization confers net gains to the decision-maker but net losses for everyone else, privatization is wealth-destroying. In Kenya, land privatization disrupted a land-sharing mechanism that amounted to insurance for local pastoralists, which led to a dramatic decline in livestock production. However, the privatizers themselves earned windfall gains in the process, mainly by conferring land titles upon themselves or those who bribed them.

But suppose that the privatizers were entirely benevolent. That is, suppose that newly enclosed land was not handed out to elites and their privileged favorites, but instead by some fair and nondiscriminatory rubric. Our argument suggests that the sort of large-scale land privatizations that Kenyan reformers engaged in might not have played out much better. Production in the absence of profit-and-loss feedback means that marginal mistakes are far more likely to go uncorrected. This is true of the production of property rights as well.

The near "corner solutions" of large-scale privatization and collectivization have wealth-enhancing or wealth-destroying effects so large that they are manifest even to the casual observer. In Kenya, for instance, the benefits to the politically well-connected recipients of these large-scale land privatizations were obvious, as were the costs imposed on local pastoralists who subsequently lost access to shared land. But the effects of smaller, more *marginal* adjustments in property regimes are not so easy to observe. It is entirely possible, for instance, that there were some (smaller) margins on which Kenyan land *could* have been privatized with an increase in productivity. Such margins, however, would have been undetected because of the wholesale nature of the land privatization. Presumably small-time pastoralists could have used their localized knowledge about smaller parcels of land to engage in secondary calculation to decide how valuable that land was to them and if bidding on it was prudent. Unfortunately, they lacked both the knowledge and the financial capital to make such decisions about large-scale land privatizations.

To put the point concretely, we can imagine that some parcels of land will yield more pastoral output if privatized. If true, then presumably some pastoralist who stands to profit could buy the land parcel from the rest of the users of the common land; he would be willing to pay up to the expected increase in income he receives from privatization. Of course, he could be mistaken. But since his decisions receive feedback in the form of revenue streams, the mistake will be made apparent. Alternatively, perhaps the other pastoralists make a mistake, and their incomes suffer worse than they expected for the loss of the land. In either case, the mistake can be corrected—the parties can strike a new contract to reintegrate the land, either selling (in the former case) or buying (in the latter) at a loss. A systemwide overhaul of the property regime, by organizations whose income only vaguely relates to pastoral productivity, provides much blurrier feedback. The overhaul can be pronounced a mistake, but it remains an open question whether some privatization on the margin might have increased productivity.

In short, large-scale land privatization in Kenya proved to be wealth-destroying in part because it excluded from the privatization process small-time pastoralists—who had better access to the sort of localized knowledge necessary to engage in secondary calculation. Consequently, decision-makers didn't receive feedback about the productivity of the reform, insofar as its benefits and costs were borne by the small-time pastoralists. This, combined with the incentive problems associated with a lack of residual claimancy, may help explain why these large-scale privatization efforts

proved to be wealth-destroying. Either large-scale privatization occurs to benefit special interests, who transfer large amounts of wealth to themselves while reducing total productivity, or, if it avoids this pitfall, it ends up lacking clear feedback about its marginal effects. Large-scale privatization fails to make use of relevant local knowledge.

The conventional justification for privatization on the basis of political fiat lies in transaction costs. The presence of nonnegligible transaction costs could stifle the kind of privatization by Coasean bargain we have suggested above. But this is exactly the point: the size of these transaction costs themselves can be known only ex post in the feedback of profit and loss. The state that undertakes mass privatization sinks vast resources into the program, but these costs remain dispersed and localized. As Hayek puts it, "The problem of a rational economic order is . . . the fact that the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess" (1945, 519). How is the state to evaluate whether any marginal adjustment in property rights is value-added when the costs and benefits of the decision are dispersed among so many who are not party to the decision?

Forward-Looking Applications to North Korea and Cuba

Our arguments in this paper not only help us explain historical cases where centrally planned economies had a much harder time privatizing effectively. They can also help us look ahead to assess how likely future privatization efforts will be to succeed in socialist economies today.

One potential application would be to use our arguments to predict what obstacles North Korea might face if it were to begin opening its economy to more market-based reforms, as China did after the death of Mao Zedong in the late 1970s. North Korea represents arguably the most extreme modern example of a centrally planned economy (for more details on the North Korean economy, see Nanto and Chanlett-Avery 2007; Nanto and Manyin 2011; Lankov 2016). All major sectors of the economy are state owned, and private property rights even for the most trivial of assets are virtually nonexistent. Moreover, because of the government's commitment to the principle of economic "self-sufficiency," the North Korean economy is almost entirely isolated from outside markets (with the notable exception of China, which accounts for roughly 96 percent of all trade with North Korea).[6] This economic isolation makes North Korea even more cut off from market price signals than many other transitioning economies.

6. Although China has been North Korea's largest (and essentially only major) trading partner for decades, it is worth noting that the trade between the two nations is heavily restricted and not subject to anywhere near the same sort of market price signals and competitive market forces that typically constitute trade between two more market-oriented economies. The trade essentially amounts to large-scale barter transactions negotiated by government officials on either side. For more information, see Nanto and Manyin (2011).

Our theory suggests that we should expect privatization efforts in North Korea to be subject to more error and inefficiency than in the many other cases of privatization, such as the aforementioned examples from Poland and other transitioning economies in Eastern Europe after the fall of the Soviet Union. Market price signals are not just muted—they're almost entirely absent. Reformers in charge of implementing privatization efforts in North Korea will not be able to assess what the optimal organizational and contractual structure is in their economy with nearly as much accuracy as elites and entrepreneurs in economies like Poland's in the post-Soviet transition, which had at least some baseline level of private property to work from and some access to market-generated prices.

An example helps illustrate this point. Suppose that North Korea decides to privatize its automobile industry. The reformers in charge of implementing this privatization face an immense challenge. Should they attempt to sell each factory separately? Or should they sell all the factories together as a conglomerate to a domestic or foreign interest? Reformers would face similar challenges in deciding how to sell inputs into the car-manufacturing process (since the North Korean car-manufacturing sector as it stands is completely vertically integrated, with all production decisions being made by central planners in the Communist Party). Should the factories that manufacture the engines for the cars be sold together with the factories assembling the cars, or should they be sold separately?

To be sure, even a reformer in a more mixed economy would face an immense epistemic challenge in making these decisions. But in this extreme case of a total command-and-control economy with minimal access to outside markets, the reformers in charge of implementing the privatization would face a far more difficult challenge than the ones in a more mixed economy. This is because, as our argument suggests, they would have no way to engage in "secondary calculation" so that they could make these determinations more effectively. The guideposts that reformers and entrepreneurs in less planned economies (like Poland) have at least *some* access to, limited as they might be, are essentially absent. Make-or-buy decisions in North Korea will essentially be made in the dark.

Another interesting forward-looking application of our argument would be to consider two possible paths toward a hypothetical privatization of the Cuban economy. As noted earlier, our argument suggests that privatization efforts in formerly socialist countries will be most successful in sectors that are subject to foreign competition and trade because they will have greater access to at least some meaningful market price signals (particularly if these foreign nations are more market-oriented economies). Suppose, for instance, that a new generation of Cuban officials suddenly decides to embark on a large-scale privatization effort, even while the United States (which would likely be Cuba's largest trading partner if Cuba were to truly open itself to global markets) maintains its heavily restrictive trade embargo with the small island economy. Desirable as this sudden privatization effort might be (especially compared with Cuba's status quo), our arguments suggest that we should expect

these privatization efforts to be messier and less effective than in other transitioning economies that were more mixed than Cuba's and had greater access to foreign markets (including many of the transitioning economies in Poland and Eastern Europe, which arguably had greater access to international trade and market prices than Cuba does today).

Alternatively, suppose that the United States instead worked in conjunction with Cuban officials to remove its trade embargo with Cuba prior to this attempted large-scale privatization. In the ensuing months leading up to the privatization efforts, Cubans would be free to buy and sell a wide variety of goods with the largest market economy on the planet. This would allow Cuban reformers and entrepreneurs to have much greater access to foreign competition and prices. They could therefore adjust their prices and production decisions accordingly in the time leading up to the implementation of the privatization reforms. This would light the path, so to speak, for entrepreneurs throughout the Cuban economy to make more informed decisions about how to adjust their production processes to better navigate the road ahead. Under these circumstances, Cuba's privatization should go much more smoothly than in the aforementioned case where foreign trade was still significantly restricted by U.S. trade sanctions.[7]

The Planner's Dilemma, Restated

The Austrians, in the course of the socialist calculation debate, granted their socialist interlocutors the assumption of a benevolent central planner. Of course, it is unreasonable to assume that a central planner would be benevolent as a matter of fact, and the history of Soviet socialism shows incentive problems lurking around every corner. Granting the assumption enabled the Austrians to take the rhetorical high ground: even ignoring the most obvious kinds of problems with socialism, the absence of economic calculation creates a devastating epistemic problem for the socialist position.

Here, we make an isomorphic argument. Even granting the assumption that privatization will be undertaken benevolently (though it rarely is), we still cannot trust central planners with the privatization process. Privatizing in a context where meaningful money prices are absent runs the risk of defining and enforcing wealth-destroying private property rights. The benevolent privatizer does not have access to the kind of knowledge necessary to make wealth-improving decisions, nor will he receive feedback about his decisions. At best, privatization will be based on a combination of rough heuristics and random chance—just like production decisions in the absence of money prices. To quote Mises ([1920] 2008), reformers will effectively be groping about in the dark when they try to engage in secondary calculation. At worst, privatization will be based on the capricious and self-centered will of powerful

7. To be clear, this is not a policy recommendation. Our theory might nevertheless give policymakers more factors to consider.

individuals seeking their own enrichment. Our key observation is that the production of private property rights is a special case of production in general. Just as the production of goods and services requires economic calculation to be economizing in any sufficiently complex economy, so too does the production of private property rights.

The problem of creating new private property rights generalizes to more or less the entire field of development economics. Development economists have for some time fixated on getting the institutions right: helping developing countries to acquire the rule of law. Our argument above suggests that such attempts, although often commendable, may be somewhat inadequate in addressing the root problems that many transitioning economies face. Though privatization is almost always more wealth enhancing than the collective ownership of resources under state control, the context that this privatization occurs in matters. Not all property rights are created equal. In a world where private property rights can be wealth-destroying, it is not enough to simply say, "Privatize." The marginal benefits and costs of any proposed property regime must be assessed to ensure that they are not destructive, but they can be accurately assessed only in a context of well-defined and well-enforced private property rights. The calculation problem extends to the creation of property rights. This should thus seriously temper any aspirations to development planning.

Conclusion

Property rights are economic goods that afford at least two advantages: improved knowledge and improved incentives. In a market, the value of both of these advantages can be appraised, as can the costs of establishing and enforcing property rights. This act of appraisal is what we have called secondary calculation, building on Piano and Rouanet (2018). The same kind of calculation undergirds both the decision to integrate in a Coasean firm and the decision to create a new property right in a good that was previously open access. Applying Piano and Rouanet's distinction to Demsetz's theory of property rights allows us to accurately understand the significance of his contribution. All in all, we believe this paper provides a further synthesis of the Austrian and property rights literature by showing that there are unexploited gains from trade between the two camps. Austrians benefit from gaining a greater appreciation of the emergence of property rights; property rights scholars benefit from gaining a greater appreciation of how alternative property regimes affect not only the incentives that actors face but also the available knowledge in society.

This finding has at least two interesting implications for further research. First, our work suggests a new kind of unity in theories of the firm. Since the value of alternative incentive structures and the value of knowledge are both assessed using secondary calculation, competing firm theories may now be seen as compatible. For instance, the conventional Coasean transaction costs account argues that firms integrate because the knowledge generated by prices is costly; Williamson (1979), for

example, argues that firms integrate to solve a possible hold-up problem generated by asset specificity. The secondary calculation approach argues that either or both may be true, but in any case the same operation determines whether the firm integrates: the decision-maker compares the expected gains from privatization with the costs. These gains may come in the form of either new knowledge or reformed incentives, or some combination of both.

Second, by arguing that Demsetz's theory relies on the use of secondary calculation, we have shown that there is a serious practical problem for emergent markets. How do private property rights as an institution come to be in contexts that have previously lacked them but are too sophisticated to economize without them? Since economic calculation requires the prior existence of property rights and market prices, private property must be either an inadvertent consequence of some other action, or the result of some kind of primitive, noncalculative economization. In either case, it is easy to see the problem for transition economies. It would seem that without access to market price signals they will not be able to define and enforce wealth-improving property rights with anywhere near the success of firms in market economies.

We have reframed Demsetz's theory of property rights as a kind of secondary calculation. The decision to privatize rests on the assessment of the costs and benefits. The implication is that we should not expect central planners or any other decision-makers who have no access to economic calculation to create private property rights with anywhere near the efficiency or success of private individuals and firms in market economies. The difficulty of efficiently privatizing resources is unavoidably greater in centrally planned economies, no matter who does the privatizing. That said, this does not imply that all privatization efforts in these settings are equally doomed to fail. There are good reasons to believe from our work that privatization efforts will be more successful if they are implemented in a bottom-up as opposed to a top-down fashion. For instance, we should expect privatization efforts to be more successful in a transitioning economy in sectors that are subject to international trade and foreign competition because they will have greater access to market prices. We can also expect privatization to be more successful when it is delegated to individuals with more intimate knowledge of the situation rather than engineered by former central planners who will likely be tempted to confer the newly privatized resources to themselves or their politically well-connected cronies. Indeed, this is consistent with what Boettke (1993) and others have argued regarding the Soviet perestroika and other economies that are transitioning from central planning to capitalism. Future scholars are encouraged to extend these insights to other contexts.

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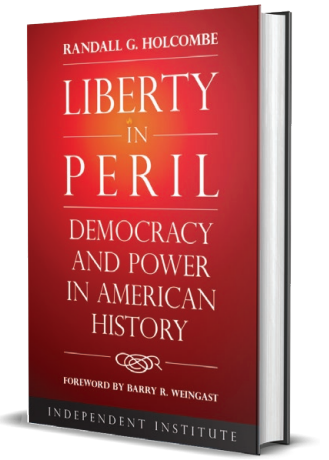
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