

Modernization, Specialization, and the Coevolution
of Agricultural Institutions

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I. No-fault institutionalism

It is said that opponents in a vigorous debate share at least one premise in common. That observation appears to characterize the three schools of thought on common property institutions. The first is the privatization school (*e.g.* Demsetz, 1967), according to which private property is the most efficient institution for governing resource allocation. The second is the centralization school allegedly represented by Hardin (*e.g.* 1968). It is by now much noted that both the privatization and centralization schools fail to distinguish between common property and open access. A third school of thought, which one might call the *communitarian* school, argues for the superiority of community control (examples may be found *e.g.* in Bromley, 1990). The debate between these schools regarding which of these three forms of organization is best is grounded in the false premise that the relative performance of alternative institutions can be judged independently from the environments in which they function. Just as the old structure-conduct-performance paradigm is now regarded as defunct, due to its implicit assumption that the structure of industries are exogenous, so too does the common property debate suffer from misplaced exogeneity.

A } The present paper takes the alternative viewpoint that institutions are endogenous and the superiority of one institution over another does not carry over from one environment to the next. The discussion is organized as follows. Section 2 provides a sketch of a conceptual framework that facilitates explanations of varying degrees of centralization of

A decision-making. Common property is seen to be an intermediate form of organization, where decision making is centralized at the local or community level. Section 3 applies the framework to the case of the modernization of agricultural economies. Concluding remarks including policy implications are provided in Section 4.

II. Conceptual Framework

The objective of this section is to sketch a theory that facilitates illuminating the potential performance of alternative organizational forms and how the relative performance responds to differences in the underlying environment. This requires first assessing the relative advantages and disadvantages of the relative organizational forms in question, central planning, decentralized decision-making, and centralized decision-making at the community level.

A natural starting point for understanding the advantages and disadvantages of privatization is Anderson and Hill (1975), who clarify and extend the economic determination thesis of Demsetz by explicitly recognizing the costs of private property. Like Demsetz (and also North, cf. note 1), however, they regard private property as inherently more efficient than either common property or open access, which they do not distinguish. The example of privatization given by Anderson and Hill concerns the American West. The cost of privatization in that example is equated with the cost of enforcement, which is in turn equated with the cost of fencing.¹ While Anderson and Hill provide an explicit theoretical

¹ Demsetz (1967) and also Douglas North (*e.g.* North and Thomas, 1969 and Davis and North, 1971), only recognize the political cost of changing the institution, not the enforcement, administration, and other organizational costs of the institution in question.

framework, they ignore the other enforcement costs, administration costs, and other organizational costs. Moreover, by failing to distinguish between open access and common property, they do not recognize the organizational costs of common property institutions. Even aside from the costs, it cannot be assumed that the benefits of private property exceed those of alternative institutional forms. Private property and bilateral contractual exchange are not well suited to efficiently allocate resources in the presence of externalities and economies of scale and scope, all of which are prevalent in developing agricultural economies. If these elements are not present, of course, then the competitive and free exchange of private property rights maximizes the total value of production in the economy and allocates resources to their highest and best use.

Another problem with the benefit-cost framework proposed by Anderson and Hill is that no theoretical or operational framework is provided for defining benefits and costs. This is not a trivial problem since the benefits and costs occur over several time periods. In the case of fencing in the American West, the benefits would be typically increasing gradually over time and the costs would be heavily concentrated during the first year. Even if the present value of the fence is positive, it is not obvious when the fence should be built. The answer is that the fence should be built when the value of current benefits rise to point where they are greater than the user cost of the capitalized value of the fence (i.e. economic depreciation plus the real interest rate).

Even this extended model, however, remains "*first-best*" in form. A genuine "*second-best*" model must allow governance costs to be determined by a comparison with the

benefits gained by getting closer to the first-best optimum, not established exogenously as in the fencing case.

For the case of renewable and non-renewable resources, the first-best condition for optimal resource use may be written as:

$$(1) \dot{P} + \frac{d}{dx} [PF(x)] = r(P-c) \quad \text{or}$$

$$(2) P-c = \frac{P}{r} + PF'(x) - cF(x)$$

where $P-c$ = is the resource royalty, defined as the resource price minus its extraction cost; $F(x)$ is the growth of the resource as a function of its own stock $F(x) = 0$ for non-renewables, and r is the real interest rate.

Since the right-hand side of (2) is the marginal user cost, (2) states that optional resource extraction is achieved when the marginal benefit (royalty) of resource use equals the marginal user cost.

Panel A of Figure 1 illustrates the optimal resource stock, X^* , in contrast to open access stock which occurs where the marginal benefit, $P-c$, falls to zero. Panel B provides the second-best solution. The marginal benefit of controlling resource use is given by user cost minus royalty. The optimum governance of resource extraction occurs where this

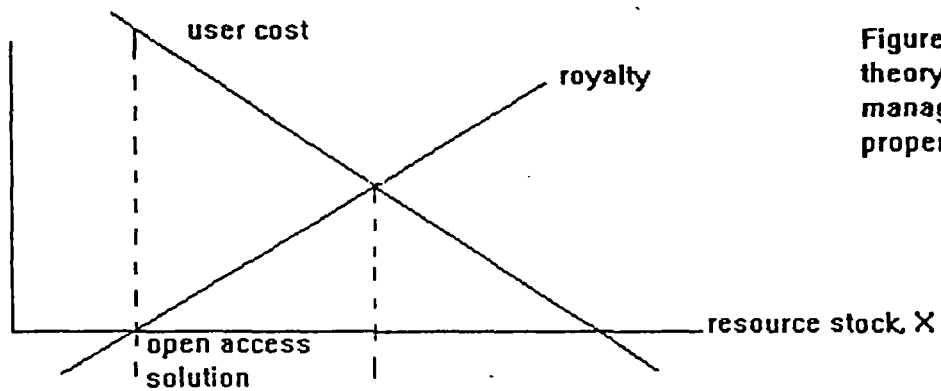
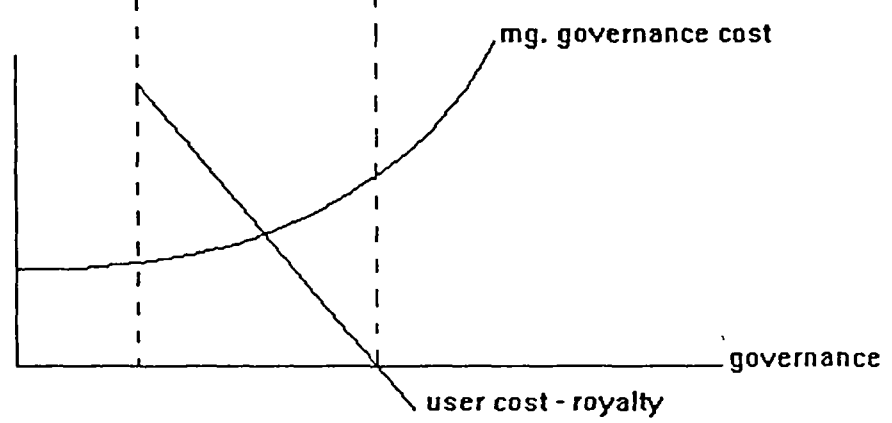


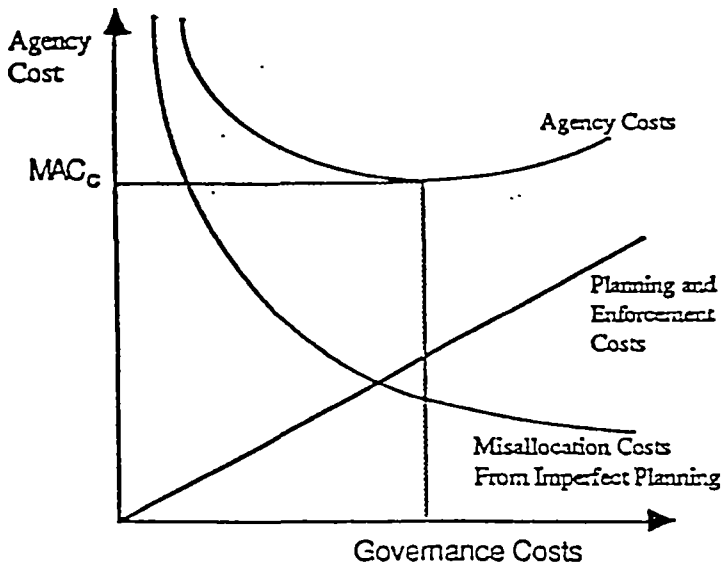
Figure 1: A second-best theory of resource management (common-property or otherwise)



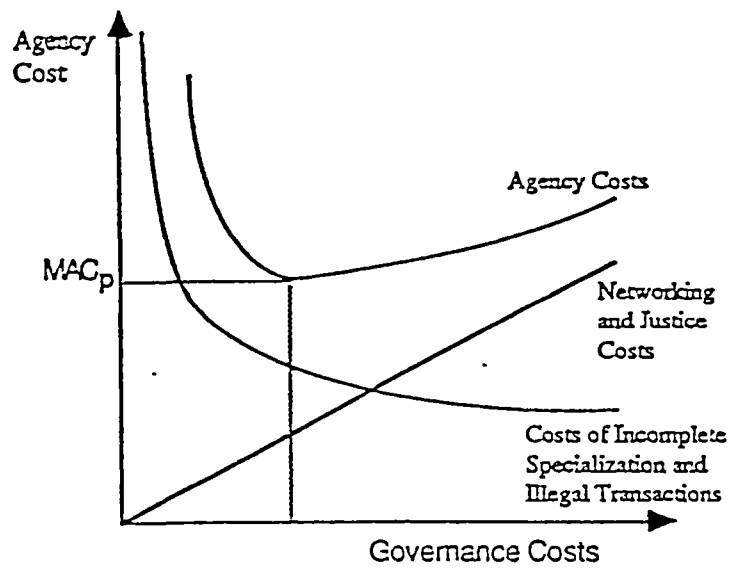
marginal benefit equals the marginal cost of governance whether it be thru socialism, capitalism, or communitarianism.

The governance costs of a unified system of private property are likely to be higher than centralizing governance only at the community level. The institutional prerequisites and governance structure of an integrated market are likely to be more costly than the sum of governance costs for a set of fragmented communities. The former case requires a unified legal system including unified standards and measures and the communication and transportation infrastructure necessary to support the unified market. Thus, despite the fact that the Anderson and Hill framework leaves out many of the relevant costs of organization and fails to discuss the limitations of bilateral contractual exchange based on private property, it nonetheless does capture the main tradeoff between private and common property institutions. Private property institutions may indeed be more efficient in allocating resources under some circumstances, but only with higher organizational costs.

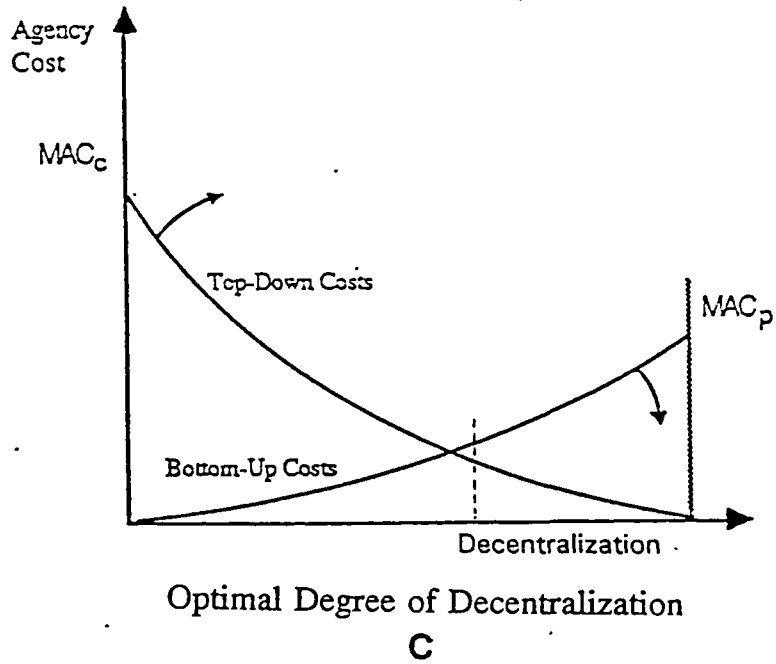
On the other hand, unification by central planning is likely to have even higher costs of governance, since the central planning authority needs to handle decision-making as well as enforcement. These considerations are depicted in Figure 2. Panel A shows the agency costs of central planning. The well-known problem of central planning, the misallocation of resources, can be reduced by greater resources allocated to planning and enforcement. The optimum amount of governance occurs where the sum of these two costs is minimized, at MAC_c . Under a system of bilateral exchange, on the other hand, there is a failure to reach the Pareto-optimal solution (even aside from economies-of-scale and externalities), due to incomplete specialization and illegal transactions. The costs of these sources of excess



Central Planning
A



Bilateral Exchange
B



Optimal Degree of Decentralization
C

Figure 2: Private Property vs. Central Planning

burden are lowered by increased expenditures on networking and the justice system.

Minimum efficient level of governance again occurs where the sum of these two costs is minimized, at MAC_p .

A number of factors can contribute to the superiority of the decentralized or hierarchical system of control. Figure 2 has been drawn in accordance with the Hayek-Radner proposition that if information is decentralized then a decentralized information processing mechanism is superior to a centralized one. However, if information is centralized, as Dostoyevsky for example suggested that it is, then centralized information processing systems are potentially superior.

The costs of central planning can be called "hierarchical" or "top-down costs". Similarly, the costs of bilateral exchange are called "bottom-up costs." For these two polarized extremes, there is only one source of agency cost; thus their total agency costs are graphed as points MAC_c and MAC_p in panel C. For intermediate organizational forms, however, such as common property management, agency costs are given by the sum of bottom-up and top-down costs. Under conditions sufficient for an internal optimum, an intermediate organizational form will be preferred over either the pure top-down or bottom-up system. This may help to explain the considerable appeal of systems such as common property which mix features of decentralization and hierarchical control. At the same time, it reveals the vast theoretical possibilities for mixed forms of economic organization, *i.e.* anything lying between the two polar extremes. Indeed, all real world systems of political economy represent such mixtures. At issue is how close a system is to one extreme or the other.

Applications of this framework may proceed by considering how underlying determinants of bottom-up and top-down costs may shift the curves in question and whether that may lead to movement to greater decentralization or hierarchical control. In addition, applications should consider, in addition to the efficiency forces sketched above, the role of rent-seeking in biasing institutional change for the benefit of particularly influential individuals or groups.

III. Modernization and common property under stress - the three nasties

It is widely believed that before the advent of the industrial age and capitalism, indigenous systems of social organization were just and harmonious, as illustrated, for example, by the "noble savage" and "Arcadia" metaphors. In this romantic view, the idyllic state is rent asunder by the politically incorrect modernization triad -- population pressure, technological change, and commercialization. It is said that the modernization triad polarizes society into a bourgeoisie and proletariat. In agricultural economies, this process is described as the "immiserization of the peasantry."

The primary logical problem with the thesis that modernization brings polarization and immiserization is that it begs the question of what are the sources of modernization. As explained by Adam Smith (1776), Young (1928) and the new classical microeconomics (*e.g.* Yang and Borland, 1990), commercialization is the result of specialization, and specialization is the centerpiece of the invisible-hand, a mechanism which itself is the result of the pursuit of well-being through the vehicle of mutually beneficial exchange.

For purposes of understanding the role of endogenous institutional change, consider a system of social organization under stress from population growth. Growth in a land-abundant agricultural economy initially causes levels of living to rise in response to learning-by-doing and the division of labor.

Population pressure changes the agency costs of both decentralization and hierarchical decision-making and implementation. The costs of hierarchical organization increase as the society grows and becomes more diverse. Both the problems of aggregating information up the hierarchy and communicating and enforcing commands down the hierarchy increase faster than population. In terms of panel C in Figure 2, this rotates the top-down curve upwards in the direction of the arrow. Similarly, the bottom-up costs curve rotates downward as the size of the market grows and economies-of-scale are exhausted. This is especially the case if per capita income rises along with population growth. As a result, the extent of efficient decentralization grows along with population and income. To facilitate this increase, however, a concomitant investment in central government control is also required to establish the institutional prerequisites of bilateral exchange.

The framework developed thus far affords an illuminating perspective on one of the most fundamental mysteries of economic development. Is specialization limited by the extent of the market, as suggested by Adam Smith, or is it the other way around? The answer provided by the above perspective is that both propositions are true. First, the efficient level of specialization is limited by the size of the potential market, as determined by population, per capita income, and natural barriers to trade (manifested in the costs of communication and transportation). Second, the actual extent of the market is limited by the level of

specialization concomitant with both the size of the potential market and by the infrastructure of cooperation established under the social contract (including the institutional prerequisites of exchange, communication and transportation and a liberalized economic policy).

Commercialization in the efficiency view is thus seen as a result of institutional change, not a cause. The induced innovation school (Binswanger and Ruttan, 1978; Hayami and Ruttan, 1985) has established the same principle for technological change. To the extent that modernization is driven by efficiency, it benefits workers by allocating labor to its highest and best use, raising marginal product and the competitive wage. If indeed modernization is correlated with falling wages, as occurred at times in the Philippines, for example, it is still incorrect to conclude that modernization caused wages to fall (Roumasset and Smith, 1981). The advantage of the neoclassical institutionalist approach advocated here is that while induced innovation theory rests on the supply and demand of innovations, theoretical constructs that are not well-defined, the neoclassical approach rests only on the fundamentals of individual rationality.²

While the theory described above is capable of generating propositions about the relative efficiency of alternative organizational forms in physical economic environments, it does not explain departures from the efficiency solution. For that, we need to understand the nature of rent-seeking. The central constitutional problem facing the establishment of a liberal order is limiting the power of the central authority to providing the infrastructure of cooperation and not allowing the authority to usurp powers of decision-making.

² To develop the supply and demand metaphor, one would define the supply and demand of innovations by price-taking inventors and innovators. Such schedules have not been defined, nor has the concept of an institutional "price."

Decentralization is in fact a central mechanism for controlling rent-seeking. The establishment of countervailing power mitigates against the dominance of any particular group. This is the second great advantage of decentralization in addition to the Hayek thesis regarding efficiency and the processing of information. When rent-seeking is unchecked, governmental authority is likely to spread into the decision making arena adequately controlled by voluntary exchange.

The intensification-specialization-modernization efficiency proposition and rent seeking proposition are illustrated in Figure 3. The efficient coevolution of property rights and governance is illustrated by the lower curve under conditions of relative land abundance, open access or *res nullius* may have the least agency cost. The right hand side of the curve represents private property and competitive markets, an efficient institutional setting under conditions of land scarcity and corresponding intensification of production and the attendant specialization. The intermediate arrangement is *res communes* which is characterized by intermediate decentralization of decision making and intermediate centralization of control. What is often lost in the debate between free markets and government intervention is that competitive markets require centralization of the governance structure in order to establish the prerequisites for unhampered bilateral exchange. The upper curve which terminates in the upper right hand corner represents socialism, the centralization of both decision-making and control. This may be the result of rent-seeking derivative of the efficient centralization of government control without constitutional safeguards to prevent the centralization of decision-making.

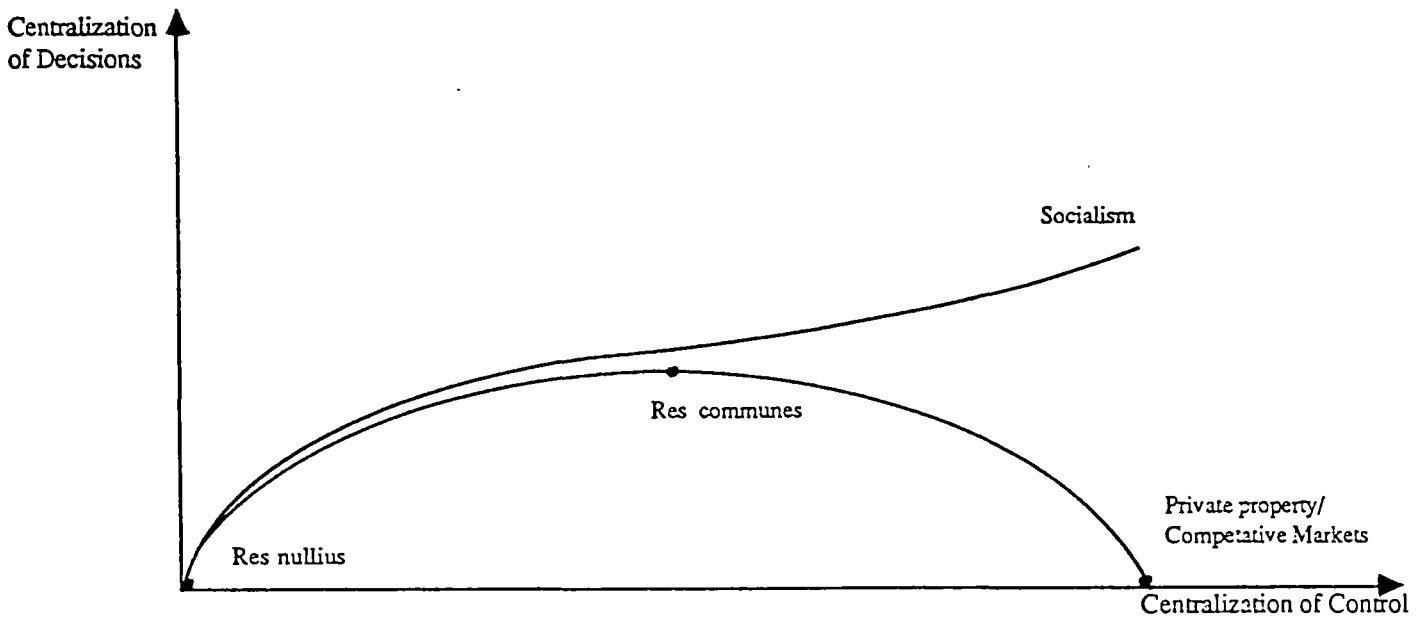


Figure 3: The Coevolution of Property Rights and Governance

It is of course possible that Dostoyevsky was right and that socialism is efficient. Only by assuming that information is in fact decentralized can we deduce the relative efficiency of competitive markets.

Rent-seeking in the pursuit of private property may be either efficiency-enhancing or reducing. As the underlying determinants of intensification and specialization increase, raising the benefits of private property and bilateral exchange, the process of privatization may lag behind what is efficient due to the political inertia of the existing system. On the other hand, the first-come-first-served aspect of claiming private property or other attractions may lead to premature privatization. It is possible that these forces are offsetting as has been suggested in the Hawaii case (Roumasset and La Croix, 1987). In other cases, the forces of premature privatization may win out, as was apparently the case in at least some instances of the English Enclosures (Allen, 1983).

IV. Concluding Remarks

One cannot generalize about the relative efficiency of socialism, capitalism, and communitarianism independently of material and economic conditions. Indeed the intermediate form, communitarianism, does not apply to a specific institutional form. Rather it accommodates everything between the knife-edge poles of pure centralism and decentralism. At issue is really what intermediate hierarchies exist between the center and the individual household and what is their relative decision-making authority relative to the center and to individual households.

The second-best theory of resource management provides a framework for explaining how changing conditions can lead to an increase or decrease in the extent of decentralization of decisions and centralization of control. In particular, population pressure, capital accumulation, and falling trade barriers all lead to the intensification of agricultural production, which leads in turn greater specialization and market deepening.

It is likely that specialization economies come in waves instead of as a constant source of growth. Adam Smith's economies of learning-by-doing and division of labor apply primarily within communities. Later waves occur as specialization takes place between communities, regions, and countries. A particularly great wave is associated with the industrial revolution as new economies of capital-intensive production and research development are experienced. These waves make it possible to explain a Smithian period of rising levels of living followed by Malthusian decline followed again by modern economic growth -- all as induced phenomena, without the contrivance of exogenous spurts of technological progress. Indeed, this view accommodates endogenous spurts of technological and institutional change -- a neoclassical theory of Prigogean growth.