

“Internal Organization in a Dynamic Context: Some Theoretical Considerations,”

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Introduction.

This essay is an attempt to suggest how process or evolutionary considerations might best be integrated into the rapidly developing transaction-cost approach to the theory of internal organization. The analysis begins by arguing that the theoretical issues in the transaction-cost approach to organization reduce to and can be integrated around a single analytical concept: imperfect structural (as distinguished from parametric) knowledge. The paper goes on to argue that this concept points toward a reinterpretation of “efficiency” explanations of internal organization in terms of an evolutionary logic of explanation. The article concludes by showing how such a reinterpretation might proceed, and suggests some substantive implications susceptible to empirical and historical scrutiny.

The last decade has seen a burgeoning of interest in the economics of internal organization.¹ This young area has already produced a literature rich in new understandings of the nature and function of nonmarket modes of organization — that is, of modes of economic coordination alternative to price-mediated spot transactions. To a very great

¹ For example: Alchian and Demsetz (1972); Fama (1980); Jensen and Meckling (1976); Klein, Crawford, and Alchian (1978); Teece (1980, 1982); and Williamson (1975, 1979, 1980, 1981, 1985).

extent, the fruitfulness of this literature can be traced to a willingness to abandon, to one degree or another, the formulations of neoclassical welfare economics in favor of a comparative-institutional analysis along the lines pioneered by Ronald Coase (1937, 1960). Rather than proceeding from an axiomatic optimization-and-equilibrium framework in which all transactions are portrayed as costless and contemporaneous, this latter approach prefers explicitly to compare alternative organizational arrangements — what Williamson (1979) calls “governance structures” — according to the kinds and costs of transacting each involves.²

But the fruitfulness of the modern literature of internal organization has not itself been entirely costless. In deviating from the more conventional paths, the comparative-institutional approach gives up some of the tidiness and formal unity that an axiomatic-maximization framework has bestowed upon the Walrasian tradition.

The trade is still an extremely favorable one for the comparative- institutional approach. Some loss of formal elegance is arguably a small price to pay to improve upon a theory that, as is often remarked, not only leaves the existence of business firms entirely unexplained but actually analyzes a world in which such firms should not exist (Loasby 1976). The modern theory of internal organization, moreover, is certainly not without theoretical coherence; it may even be said to have a single unifying principle: the notion of the transaction cost. Nonetheless, there remains a sense in which the eclecticism of the comparative-institutional approach borders on [24] the *ad hoc*; and, as even the most ardent proponents of this approach admit, the idea of a transaction cost is itself still a somewhat fuzzy concept (Williamson 1979).

² For an elaboration of this distinction between the welfare-economic and the Coasean approaches, see, for

Part of this untidy appearance is surely endemic to the nature of the phenomena under study; it cannot — and should not — be eliminated. There really is some trading off to be done between theoretical elegance and explanatory power. At the same time, I would argue, part of the seemingly *ad hoc* character of transaction-cost analysis is not entirely ineluctable, and arises from a rather different source. In rejecting, whether implicitly or explicitly, the formal core of mainstream neoclassical theory, the internal organization literature has abandoned one organizing principle — one microeconomic logic — without having found another to take its place. It is a literature that employs many of the trappings of neoclassical theory (*e.g.*, maximizing language and an apparent equilibrium orientation) to express insights that (as I shall argue) are fundamentally antagonistic to the neoclassical research program. Life in this sort of theoretical limbo is guaranteed to breed an appearance of being *ad hoc*.

Fortunately, there is, I believe, an alternate theoretical structure with which the transaction-cost approach might ally itself: the “dynamic” or “evolutionary”³ view of economics. This essay is an attempt to suggest how such a connection might be made. In what follows, I will argue (A) that the basic insight of the transaction-cost approach already implies an evolutionary view of economics; (B) that such a view helps reinterpret results from the theory of internal organization in a way that makes the analysis seem far less *ad hoc*; and (C) that a dynamic orientation has substantive implications for our understanding of organizational form that are not now fully recognized in the literature.

example, Demsetz (1969) and Dahlman (1979).

3 The canonical locus of this view is Nelson and Winter (1982); but see also O’Driscoll and Rizzo (1985). For a survey, see Langlois (1982a).

Transaction costs and internal organization.

It is not without justification that historical discussions of the theory of internal organization invariably point to Ronald Coase's 1937 article "The Nature of the Firm" as a (and sometimes the) seminal article in the field. But there is also an important sense in which a later article by Coase — one seemingly aimed at a quite different area of theory — has held equally important insights for the modern comparative-institutional analysis of organizations.

In the 1937 article, Coase took up a question that economists had to that point largely ignored.⁴ Why is some economic activity organized within business firms? Why is not all economic activity coordinated by prices and markets? Coase's answer is that there is "a cost to using the price system" (Coase 1937, p. 390). The costs to which he points are clearly recognizable as the same sorts of transaction costs that animate present-day discussions.⁵ But the Coase of 1937 was less interested in institutional comparisons than in reconciling analysis of the firm with the basic concepts of Marshallian comparative-statics. Thus the famous assertion that the firm will expand until the cost of internalizing the next transaction is equal to the cost of leaving that transaction to the price system. (Coase 1937, p. 395).

It was really in Coase's 1960 article, "The Problem of Social Cost," that the importance and implications of transaction costs crystalized in clearly institutional form. The article is a reexamination of the problem of "externalities" or, more correctly, of incompatible uses of property rights. Coase attacks what he describes as the Pigovian tradition, in which incompatible uses were understood in terms of a divergence between

4 An exception was Frank Knight (1971 [1921]).

5 In fact, a close reading of "The Nature of the Firm" shows that Coase's explanation for firms ultimately reduces to what I describe here as incomplete structural knowledge. I have gone through the exegesis of this argument in an earlier working paper. [Langlois (1981).]

private and social cost caused by so-called physical externalities. And his method of attack is to effect what one might call an “externality shift”: in the absence of transaction costs, Coase argues, all incompatibilities in the use of property rights would be resolved in more-or-less optimal fashion; the problem, therefore, is not the “physical externality” at all but whatever informational or public-goods type externality lies behind the transaction costs that impede bargaining. The most important implication of this externality shift is a redirection of attention away from a “market failure” conception of the problem toward an analysis in which the properties — including transaction-cost properties — of alternative institutional arrangements are the principal focus (Dahlman 1979).

The modern literature of internal organization reflects, in effect, a recognition that this logic of analysis can be extended beyond the range of incompatible-use problems with which Coase was concerned in the 1960 article. In general, there are a number of arrangements one might consider as ways of resolving pollution or nuisance-type incompatibilities: contractual agreements, as between the farmer and the rancher in Coase's famous example, might be one way; rules and social conventions might be another; and the exchange of property rights — as when one owner buys out the other — might be a third way. But these alternatives do not present themselves only in response to “physical” externalities of the nuisance/pollution sort; they are quite general phenomena of production and economic exchange.

Among the many institutional comparisons that the theorist of organizational form might address, perhaps the most intriguing is that between the system of coordinating economic activity through price-mediated spot-contract exchanges (the market-contract mode) and the system of coordinating such activity within a business firm (the internal-organization mode). The difference between these modes is best conveyed by an illustration,

and the best illustration is perhaps that of rifle manufacture in Birmingham, England, in the 1860s as quoted by George Stigler (1951, pp. 192-193).

The master gun-maker — the entrepreneur — seldom possessed a factory or workshop. ... Usually he owned merely a warehouse in the gun quarter, and his function was to acquire semifinished parts and to give those out to specialized craftsmen, who undertook the assembly and finishing of the gun. He purchased material from the barrel-makers, lock-makers, sight-stampers, trigger-makers, ramrod-forgers, gun-furniture makers, and, if he were engaged in the military branch, from bayonet-forgers. All of these were independent manufacturers executing the orders of several master gun-makers. Once the parts had been purchased from the “material-makers,” as they were called, the next task was to hand them out to a long succession of “setters-up,” each of whom performed a specific operation in connection with the assembly and finishing of the gun. To name only a few, there were those who prepared the front sight and lump end of the barrels; the jiggers, who attended to the breech end; the stockers, who let in the barrel and lock and shaped the stock; the barrel-strippers, who prepared the gun for rifling and proof; the hardeners, polishers, borers and riflers, engravers, browners, and finally the lock-freers, who adjusted the working parts. (Allen 1929, pp. 56-57.) [26]

This rather colorful description provides at least some sense of what it would mean to organize production entirely in the market-contract mode.⁶ Each specialist owns his or her own tools (there is no separate “capitalist” who owns the means of production), and each's relationship with the master gun-maker is that of an independent contractor not an employee. By contrast, production in the internal-organization mode would look much more like the factory system to which we are accustomed: tools and machinery would be owned not by the specialists themselves but by a functionally distinct owner or owners (e.g., the stockholders), and the relationship of the specialist to the owner or owners would be not

6 Even this is not the purest example we could imagine. In this story the entrepreneur presumably owns the gun parts throughout the process and merely rents the labor of each specialist (who owns his own tools), paying him on a per piece basis. But we could imagine a world in which each specialist sold the partly finished product outright to the specialists in the next stage of production, who in turn sold the more nearly finished product to the specialists in the next stage, etc. Many other variants are possible, of course. For a catalogue, see Williamson (1980).

that of a contractor but of an employee.⁷ Most real-world production is carried out in a way that mixes these two modes, but the ideal types are useful for theoretical purposes.

The issue facing the analyst of internal organization is: why do we observe one mode and not the other or, more generally, when should we expect to observe one mode and when the other? And the analysis proceeds in a manner parallel to — but in crucial respects different from — the analysis of incompatible uses of property rights.

The analyses are parallel in that they compare the transaction-cost properties of specific alternative institutional structures. They are different, however, in that the Coase analysis of incompatible uses of property rights is largely a normative exercise while the analysis of internal organization is principally a descriptive matter. The former assesses the transaction-cost properties of the alternatives in order to investigate which is the cheaper or more efficient; the latter does the same, but then goes on to use the conclusions about relative efficiency to explain why and predict when we should observe an organizational alternative. The dominant style of analysis in the literature of internal organization is implicitly (and sometimes explicitly) to presume that the reason we observe one mode of organization rather than the alternatives is that the observed mode is more efficient — in the sense of minimizing the sum of production costs and transaction costs — than those alternatives; the task then becomes one of scrutinizing the structure of transactions each

⁷ The distinction between an employee contract or employee relationship and a contractor relationship lies in the specificity of the agreement between the parties. A contractor is paid to provide a relatively specific service, and his remuneration is tied to performance of the service (e.g., a piece rate for gun parts). An employee is paid to perform any of a range of services at the employer's discretion. More formally, the employee performs any service $x \in \Omega$, where Ω is a set of possible services mutually agreed to by employer and employee and x , which may vary over time, is the specific service chosen by the employer. One could think of X as a detailed position description. Those who conceive of X as explicitly known and bargained over talk of the employment contract; those who recognize the extent of X to be more tacitly understood or implicit in nature talk of the employment relation, a term that, in any case, is preferable to the more loaded "authority relation" (Cf. Williamson 1975, pp. 71-72).

alternative implies in order to determine the causes of this relative efficiency.⁸ To explain, for example, why the internal-organization mode (in the sense described above) largely supplanted the market-contracting mode in production, one would typically ask what it is in the structure of transacting that makes the former less costly than the latter.

This is not necessarily an easy question. Indeed, by the standards of Coase (1960), the market-contract mode would seem to be an ideal system. Property rights are clearly defined; and transaction costs are low in the sense that face-to-face bargaining and exchange among the rights-holders is relatively easy. One early line of argument was to suggest that, while the market-contract mode was indeed entirely efficient in a more primitive state of technology, changes in the machinery of production ultimately made internal organization the more efficient alternative. This hoary explanation was placed within the Coasean framework by Alchian and Demsetz (1972), who argued that indivisibilities in the technology of production could lead to an externality problem akin to the “tragedy of the commons.” Employing the “externality shift” in another guise, they showed that an externality arose in team production not so much because the technology tied the workers together in some physical sense as because such technology made it difficult to determine each team member's marginal product and award him or [27] her accordingly. As a result, efficiency would be enhanced under an alternate system in which one member of the team bought out the capital of his fellows, hired them to employment contracts, and, with the incentives of a residual claimant, undertook to monitor the team's output. In other words, the internal-organization

⁸ It is in this way that the modern theory of internal organization attempts to elude the charge of tautology often leveled at Coase's 1937 analysis (*e.g.*, by Alchian and Demsetz 1972). By finding an independent explanation of efficiency in terms of the transactional structure, one avoids the appearance of first defining relative efficiency as the ability to supplant an alternative mode of organization and then using the concept of efficiency to explain why one mode supplanted another. This issue will surface again below in a slightly different guise.

mode is superior when technology creates the sorts of transaction costs associated with metering and monitoring team output.

This analysis is generally regarded as unexceptionable as far as it goes — which is not, unfortunately, very far. The problem is that we observe there to be far more internal organization than one could possibly explain on technological grounds. If the Alchian and Demsetz explanation were in fact the only explanation, we would not expect to see the internal-organization mode, but rather something nearer the market-contract mode in which individual specialists were replaced by small teams of specialists operating various indivisible parts of the production process. I think it is now generally agreed that “joint production can explain only a small fraction of the behavior of individuals associated with a firm” (Jensen and Meckling 1976,p. 310).⁹

As a result, theorists have had to look beyond indivisibilities for the source of the transaction costs that might explain the relative efficiency of the internal-organization modes we observe. A number of such sources have been proposed; but the alternative that seems lately to have won out is the notion of “opportunism,” often coupled with the suggestion that human “information processing” abilities are limited (Williamson 1979; Klein, Crawford, Alchian 1978). Opportunism, as one might guess, is the ability of one party in a transaction to take self-seeking advantage of the other party, often as the result of superior information. Opportunistic behavior of this sort can lead to inefficiencies; and transactions subject to such opportunism might thus be carried out more efficiently if internalized within

⁹ Williamson (especially 1975, ch. 5) has shown in general that technological interdependencies among stages of production is neither a necessary nor a sufficient condition for internal organization. Much that is technologically separable is not efficiently handled by market contracts, and some processes that are technologically linked can in fact be coordinated efficiently through contracting. Teece (1980) has made a similar argument for economies of scope, suggesting that the presence of economies of scope in the production function has few implications by itself for the scope of internal organization.

a single organization. The most important occasion for opportunism of this sort is when a transaction involves the commitment of resources in a highly specific or idiosyncratic way, leading to what Klein, Crawford, and Alchian (1978) call “appropriable quasirents.”

Although it has never been fully articulated, it seems to me implicit in the literature that this question of specificity or idiosyncrasy is really of more fundamental theoretical interest than is opportunism — or even limited “information-processing” abilities — per se.¹⁰ Indeed, I think the matter can be analyzed in terms of a clear theoretical distinction that, while not perhaps rendering the comparative-institutional approach to internal organization fully as elegant as general-equilibrium theory, at least provides that approach with a somewhat cleaner theoretical profile. At the same time, though, the distinction I will offer may also call for a reexamination of the “efficiency” approach to explaining modes of organization.

The problem of structural knowledge.

The reason that opportunism or similar effects may lead some modes of organization to be more efficient than others is that such opportunism somehow creates transaction costs of a particular kind. It is the nature of these transaction costs that we are concerned with in explaining the relative efficiency of institutional structures. [28]

I suggested earlier that the notion of a transaction cost is often admitted to be somewhat fuzzy and hard to define. The most successful exegesis of the concept is probably that by Carl Dahlman, who teases out from Coase's discussion three categories of transaction cost: search and information costs, bargaining and decision costs, policing and

¹⁰ This is especially clear in the work of Teece (1982a, 1982b), who stresses the importance of idiosyncratic — and often tacit — knowledge in the analysis of specialized assets.

enforcement costs. “Yet,” says Dahlman, “this functional taxonomy of different transaction costs is unnecessarily elaborate: fundamentally, the three classes reduce to a single one — for they all have in common that they represent resource losses due to lack of information.” (Dahlman 1979, p. 148). If one always knew the full extent of the transactions available; if one could always anticipate the terms offered and strategies used in bargaining; and if one always knew instantly whenever there occurred deviations from the agreed terms of contract — then transacting would always be costless.

I think this analysis of transaction costs is very much on target. But I also think that, having collapsed all such costs into the “lack of information” category, we now need to make new distinctions within this category if we are to explain internal-organization modes. What I propose is that there are two distinguishable types of lack of information. And only one of these provides an efficiency rationale for the existence of a significant degree of internal organization.

Perhaps the best way to see this is to begin by noticing that some sorts of lack of information are entirely consistent with a fully price-decentralized market-contract mode. In the extreme case of a general-equilibrium world, uncertainty of a specific kind is allowed for in the contingent-claims-contract formulation; yet, as Loasby (1976) and others have pointed out, there is no need whatever for internal modes of organization in such a world.

What sort of lack of information is implied here? The conception of ignorance and uncertainty in general-equilibrium theory — and indeed throughout the whole of “neoclassical” economics — is actually a very restricted and narrowly construed one. A definitive spokesman puts it this way. Uncertainty means “that we do not have a complete description of the world which we fully believe to be true. Instead, we consider the world to

be in one or another of a range of states. Each state of the world is a description which is complete for all relevant purposes. Our uncertainty consists in not knowing which state is the true one.” (Arrow 1974, p. 33). Uncertainty of this sort is incorporated into the maximization formalism in the following more-or-less-canonical fashion.¹¹ If \mathbf{a} is the vector of possible actions an agent may engage in; $\{x_i\}$ is the set of states of the world the agent believes possible; $\{p_i\}$ is the set of (subjective) probabilities the agent associates with those possible states; and $U(\mathbf{a} | x_i)$ is a function relating the agent's utility to his or her actions and to the possible states of the world, then the agent's problem is

$$\max_{\mathbf{a}} \sum_i p_i U(\mathbf{a} | x_i),$$

i.e., to maximize the expected utility of possible actions.

It is frequently instructive to compare the economist's definition of a term with the meaning that term holds in every-day discourse.¹² In this case, such an exercise begins to suggest why the economic definition is in [29] fact so restricted a conception of uncertainty. Loasby puts it this way. “When someone says he is uncertain, what he usually means is not just that he doesn't know the chances of various outcomes, but that he doesn't know what outcomes are possible. He may well be far from sure even of the structure of the problem that he faces”¹³ (Loasby 1976, p. 9).

¹¹ For an excellent survey of the mathematical economics of information and uncertainty, see Hirshleifer and Riley (1979).

¹² The term “competition” is, of course, another — and closely related—example.

¹³ The view of uncertainty Loasby here describes has long been urged on the profession by G.L.S. Shackle (on whom we see below). This broader view of uncertainty also tends to crop up in the work of writers interested in innovation and technological change. In addition to Loasby, see, for example, Klein (1977) and Schon (1971).

What is often overlooked in the neoclassical literature of information and uncertainty is that its formalism implies certain-knowledge as much as it allows for uncertainty. The agent is implicitly presumed to have an exhaustive list of possible actions and states of the world and, equally importantly, a means/ends framework relating the actions and the states of the world to his utility. We might say that the agent has certain-knowledge of the structure of the problem he faces or, to put it another way, that he has perfect structural knowledge. Imperfections in the agent's knowledge extend only to specific parameters of the problem — the x_i — that are obscured from his vision.¹⁴ He may have imperfect parametric knowledge, but never imperfect structural knowledge; he may acquire parametric information, but never structural information.

In some ways, the distinction I'm offering is not an entirely novel one; there have long been a number of similar-sounding distinctions floating around the literature, many of which come extremely near to what I'm driving at. But I also think that the words “structural” and “parametric” help avoid confusion and —more importantly— serve to emphasize the essentially structural nature of knowledge.¹⁵

¹⁴ Of course, one may represent the agent as uncertain as between a number of given problem structures (Marschak and Radner 1972, pp. 12-13); but this just pushes the structural knowledge problem one level higher.

¹⁵ Indeed, my principal motivation for offering this structural/parametric distinction is to provide a new language for — a new way of talking about — aspects of economic behavior that might be treated in other ways (*e.g.*, under the rubric of “bounded rationality”). For example, many of the implications I will draw from this distinction might also be drawn from a formulation in which there is perfect structural knowledge — but in which that known structure is so complex that the agent acts in effect as if he were uncertain of the structure. This is essentially Herbert Simon's well-known formulation. In emphasizing complexity and information-processing abilities alone, however, one has not strayed very far from the neoclassical maximization paradigm; in fact, “bounded rationality” in Simon's sense can be reduced to neoclassical optimization (Baumol and Quandt 1964). By contrast, the structural/parametric terminology helps to underscore the extra-neoclassical side of the phenomenon and thus helps to make clearer the pattern of argument that I am attempting to draw in this paper.

Perhaps the best-known of these distinctions is Frank Knight's treatment of “risk” versus “uncertainty” (Knight 1971 [1921]).¹⁶ It has been my experience that every economist believes he or she understands what Knight meant by this distinction — but that no two economists agree on what the distinction is. At one extreme are interpretations that see Knightian uncertainty as akin to structural uncertainty in my sense; at the other extreme are interpretations that see the issue as one of insurable versus uninsurable risk; and there are interpretations in between. My suspicion is that Knight intended something closer to the structural/parametric distinction; but in casting the matter in terms of one's ability to “calculate the probabilities,” he opened the door to unnecessary confusion. So long as the categories are fully agreed upon, the “noncalculability,” “subjectivity,” or “controversiality” of probabilities per se provides no impediment to market contracting and therefore no rationale for internal organization; in fact, divergences of opinion about probabilities are an important source of gains from trade in contracting.¹⁷

The notion of imperfect structural knowledge is probably most akin to (and, of course, influenced by) the analysis of G.L.S. Shackle, who has long stressed the economic importance of the unknown, the unforeseen, and the unlistable (Shackle 1972). Shacklean uncertainty often goes by the name *radical* uncertainty. For the most part, however, Shackle's arguments have been taken (not entirely without justification) as attacks on our ability to theorize meaningfully about behavior under uncertainty. The semantics of structural

16 Ludwig von Mises (1949) drew a similar distinction between case probability and class probability. (For a discussion of the probabilistic analyses of Knight, Mises, and G.L.S. Shackle in light of modern subjective probability theory, see Langlois (1982b).) More recently, Teece (1982) has drawn attention to Koopmans distinction between primary uncertainty and secondary uncertainty (Koopmans 1957, pp. 162-163). While this distinction is no doubt an important one, it does not seem to be a distinction between types of uncertainty but between sources of uncertainty. Primary uncertainty appears to mean uncertainty that arises from exogenous sources like discoveries about nature or changes in preferences; secondary uncertainty seems to mean uncertainty generated within the economic system itself by one agent's imperfect information about the decisions being taken simultaneously by other agents.

uncertainty is intended to convey the opposite sense: to suggest — as I hope to articulate more fully below — that qualitative and categorical change is in fact susceptible to analysis within the proper theoretical framework. Moreover, the emphasis on structure is consistent with the view of knowledge taken in other fields, and it may help counterbalance the excessively behavioristic interpretation of information to [30] which economic modeling is often susceptible (Langlois 1983).¹⁸

Imperfect structural information and internal organization.

None of what I've said so far need be interpreted as criticism of the mathematical optimization approach to information and uncertainty. The assumptions of that approach may well be entirely appropriate to its uses; I am not prepared here to argue that case one way or the other. My only contention is that if one restricts the notion of “lack of information” to mean merely an imperfection of what I have called parametric information, then one is never going to find the source of the transaction costs that provide internal modes of organization with a comparative-efficiency explanation.

¹⁷ This assertion anticipates in part the argument of the next section.

¹⁸ We are fortunate that the late Fritz Machlup has left behind a mostly completed manuscript on the semantics of information and knowledge in the sciences (Machlup 1983). A close reading of this manuscript suggests that the structural/parametric distinction nowhere runs afoul of Machlup's gentle strictures on usage and is in fact quite consistent with ideas elsewhere in the information sciences broadly construed. As Machlup points out, the idea of form is closely related to the idea of information, since the word's Latin root means “to put into form.” And he quotes approvingly this passage from Boulding: “. . . we cannot regard knowledge as simply the accumulation of information in a stockpile, even though all messages that are received by the brain may leave some sort of deposit there. Knowledge must itself be regarded as a structure, a very complex and frequently quite loose pattern, . . . with its parts connected in various ways by ties of varying degrees of strength. Messages are continually shot into this structure; some of them pass right through its interstices . . . without effecting any perceptible change in it. Sometimes messages 'stick' to the structure and become part of it . . . Occasionally, however, a message which is inconsistent with the basic pattern of the mental structure, but which is of a nature that it cannot be disbelieved hits the structure which is then forced to undergo a complete reorganization” (Boulding 1955, 103-104).

Now, it is possible to use imperfections in parametric knowledge to generate an efficiency explanation for internal organization of a limited sort. Indeed, the Alchian and Demsetz argument is exactly of this form. The workers in a joint-production activity are united in a known-and-agreed-upon optimization problem: to maximize the value of their joint output. A critical parameter in this problem — the value of each team member's marginal product — is obscured from each agent's vision under a decentralized market-contract arrangement; and it is the residual claimant-monitor's superior knowledge of this parameter that makes the internal-organization form appear more efficient. But the problem, as we saw, is that this analysis cannot explain the full extent of internal organization.

Similarly, it is possible to construct models in which the internal- organization mode is more efficient than a decentralized market-contract mode because the former allows for better knowledge of a critical parameter like input availability (Arrow 1975). But such analyses are not typically comparative-institutional in form; rather, they take the “market failure” approach, in which the nonoptimality of the market-contract mode is viewed as a presumption that the internal-organization mode is not merely more efficient but actually the only alternative. In fact, of course, there are normally a number of intermediate contracting modes and organizational alternatives available to handle these various imperfections in parametric information in a fashion at least as efficient as that of the pure internal-organization mode. For example, Williamson (1980) has argued that a decentralized contracting system using buffer inventories between successive stages of production is able to circumvent the inefficiencies attendant on uncertainties in input availability.

The point seems to me a quite general one. If the only imperfections in knowledge at stake were those of this parametric kind, then decentralized contracting would always be a

cheap organizational alternative. This sort of imperfect information is precisely what state-contingent contracting, including the form practiced on organized futures markets, is all about. If all participants to a transaction really are aware of and certain about all the facts of the situation, and are in complete and detailed accord as to all possible contingencies, then decentralized market-contract arrangements should not be at a significant transaction-cost disadvantage.

Indeed, it is my suspicion that, in situations in which only parametric imperfections in information are involved, the market-contract mode — with the help of an organized futures market — is always at least as efficient as [31] any other mode.¹⁹ This is equivalent, in the terms of the comparative- efficiency logic of explanation, to a suspicion that imperfect parametric information of the sort treated in mathematical-optimization models can never provide an efficiency rationale for internal organization. In either need nor wish to make an unequivocal stand on this point here.²⁰ Instead, I'd like to try to do the next best thing: to show that the leading efficiency explanation for internal organization — the danger of “opportunism” in contracting situations — can be reduced to and understood in terms of imperfection in structural knowledge.

The basic idea of the opportunism explanation is fairly simple: there can often arise contracting situations in which one or both parties to the contract is able to take advantage of informational asymmetries (including asymmetries he has himself created through some

¹⁹ I am excluding Alchian-and-Demsetz situations in which, for purely technological reasons, individual property rights cannot be clearly defined.

²⁰ The reason for my diffidence is that I can think of no better way to prove the assertion than by example and counterexample. If you give me a case of imperfect parametric information in which internal organization appears clearly more efficient than the market-contract mode, I can show either (a) that the situation really involves a problem of structural knowledge or (b) there exists an intermediate contractual alternative that is just as efficient. But this is not the best sort of proof one could wish for.

form of deception or dissembling) to effect a transfer of wealth from the other party to himself. A prime example of this is when one party has irreversibly committed resources to a production activity. The other party can then threaten to renege — and thereby inflict a capital loss on the first party — if that first party does not surrender some of the rents of his irreversible investment. When such opportunistic behavior is likely, the transaction will appear costly *ex ante*, and the alternative of organizing the activity internally becomes relatively more efficient.

The first thing to notice is that the source of the transaction costs here is not the self-interest-seeking aspect of opportunism: self-interest-seeking is assumed present in, and indeed necessary for, even the most efficient instances of contracting. At the most fundamental level, the source of the transaction costs — once again — is a lack of information.

Williamson recognizes this point implicitly when he insists that opportunism is important only in conjunction with what, following Herbert Simon, he calls bounded rationality. “But for the *simultaneous* existence of both bounded rationality and opportunism,” he writes, “all economic contracting problems are trivial and the study of economic institutions is unimportant.” (Williamson 1981, p. 1545, emphasis original.) What is “bounded rationality”? For present purposes it amounts to the notion that it is impossible to foresee all the relevant contingencies and therefore impossible to specify all such contingencies in a contract; therefore, contracts must often remain “incomplete.”

Opportunism, in Williamson's analysis, is a distinct phenomenon that serves to make matters worse.

Ubiquitous, albeit incomplete, contracting would nevertheless be feasible if economic agents were completely trustworthy. Principals would simply

extract promises from agents that they will behave in a stewardship fashion, while agents would reciprocally ask principals to behave in good faith. Such devices will not work, however, if some economic actors (either principals or agents) are dishonest (or, more generally, disguise attributes or preferences, distort data, obfuscate issues, and otherwise confuse transactions) and it is very costly to distinguish opportunistic from nonopportunistic types *ex ante*. (Williamson 1981, p.1545.)

The interpretation this passage suggests is that opportunism is indeed a parametric-information problem. One may be able to foresee all contingencies; but those contingencies include a state of the world labelled “opportunistic behavior” — and one doesn't know ahead of time whether or not that state will occur. This is the paradigmatic form of a parametric-information problem. And opportunism is thus a source of inefficiency in the same sense that a state of the world labelled “hurricane strikes agricultural region” would be a source of inefficiency: society would be wealthier if that state could not materialize (or, more generally, if it could be assigned a lower probability).²¹

All of this seems to me a valid and useful way to look at the problem of opportunism. But there remains an equally valid sense in which opportunism is not ultimately a problem of imperfect parametric information: for if there really were no imperfections in structural knowledge — if all contingencies really could be specified — then opportunism would be impossible.

In order to see why this is so, one first needs to get straight on what opportunism involves. If, as Williamson suggests, opportunism consists in taking advantage of one's

²¹ This is one way to understand some of the now-popular arguments about how cultural factors give Japan certain economic advantages. Because Japanese culture places a premium on non-opportunistic behavior in economic relations, the argument goes, fewer resources are wasted in guarding against opportunism, and contracting is less costly in that country. In fact, one apparently does see greater use of subcontracting in Japanese industry than in American (but one also sees a good deal of internal organization). Schotter (1981) uses a recurrent-game model to analyze the ability of social norms and cultural conventions to reduce transaction costs. The brand-name capital effect popularized by Benjamin Klein (1974) is a closely related idea.

ability generally to confuse, mislead, or dissemble, then, I would argue, this is already clearly a problem of imperfect structural knowledge: there is no meeting of the minds because the parties do not see the structure of their joint problem identically. Now, one may lie, dissemble, or obfuscate in regard merely to some parameter of an otherwise mutually agreed-upon problem — one's actual ability to produce a certain number of widgets, for example, or the true cost of some input. But surely this is the sort of informationally opportunistic behavior most easily (*i.e.*, cheaply) dealt with in contract.

Consider in this connection the guise in which opportunism shows up most frequently: the holdup phenomenon associated with appropriable specialized quasirents (Klein, Crawford, and Alchian 1978; Goldberg 1976). Here the problem is that, once a contract is signed, one of the parties to it can exploit the specialized fixed investment of the other party by threatening to pull out of the contract; the opportunistic party may thus be able to appropriate some or all of the rents the transaction partner would otherwise lose if the deal did in fact dissolve. The question we must ask is: how is it that the two parties would have agreed *ex ante* to a contract vulnerable in this way to opportunism *ex post*? And the answer has to be that the opportunism was unexpected in some sense. But in what sense? If we are to maintain the hypothesis that all contingencies are foreseen, it cannot be because the specific circumstances leading to the possibility of opportunism were not anticipated. That means that one party must have entered into the contracting knowing he might be exploited. Why would he do that? A possible answer — and one that I suspect is implicit in the literature — is that the vulnerable party had no choice, that is, accepting the contract even with the anticipated possibility of opportunism is the best alternative available to him.

Unhappily, this is not an entirely satisfactory story. First of all, to take it seriously — in a world in which all contingencies are foreseen — is to collapse the opportunism explanation into a monopoly explanation. If my entering into a contract will result in a specialized investment, and if *ex ante* there are few potential contracting partners, then I may be forced to accept the danger of opportunistic expropriation or invest resources to prevent expropriation (*e.g.*, by using a more-flexible but more-expensive technique of production); as a result, internal organization may be a more efficient way to organize the transaction. But the costliness of contract[33]ing arises not because of opportunism but because of the *ex ante* fewness of transaction alternatives. As Demsetz pointed out in a related context, the specialized nature of an investment *ex post* leads to inefficiency only if there is inadequate competition *ex ante*²² (Demsetz 1968). The monopoly explanation of internal organization certainly provides an efficiency rationale for internal organization; but it is at best a partial explanation, since we observe much — if not most — internal organization in situations that are competitive in this *ex ante* sense.

Now, one might argue that, *ex ante* competition notwithstanding, the creation of a specialized asset results in problems of opportunism (a) at the time of contract renewal or (b) to the extent that one can renege on a contract with legal impunity.²³ But such an argument would make my point even clearer. Barring an outright failure of the legal system to enforce explicit contracts (or a persistent and systematic inappropriateness in that system's awards of damage for breach of contract), the only way one can renege on a contract with impunity is if the specifications it contains are vague or incomplete — that is to say, only if the

²² In fact, I would argue, the correctness of Demsetz's argument depends on the assumption of perfect structural knowledge — but this is, of course, the assumption I am now operating under.

informational problem involved is one of imperfect structural knowledge.²⁴ Opportunism at contract renewal is certainly a real problem. But why is it necessary to renew the contract? If all contingencies were foreseeable in complete detail, one could easily write a long-term contract — indeed, an infinitely long-term contract in the limit — and the problems of opportunism at contract renewal would be entirely eliminated at no cost. The reason that long-term contracts are infeasible or expensive, of course, is that one cannot foresee all contingencies in detail in advance. Which is precisely my point. The reigning comparative-efficiency explanation for internal organization ultimately reduces to an explanation from imperfect structural knowledge.

Organization and efficiency: a reinterpretation.

If by now the reader is, as I hope, persuaded that the distinction between structural and parametric knowledge is a valid one, and that it is the former to which we should look in explaining the transaction-cost underpinnings of internal organization, he or she may nonetheless wonder why the distinction is an important one. Why is it significant that the most solid — and perhaps even the only — comparative-efficiency explanations for internal

²³ By this I mean that one can break a contract without being forced to pay damages equal to the capital loss the breach inflicts on the owner of the specialized asset. For an argument that this is the correct economic measure of damages in breach of contract, see, *e.g.*, Posner (1977, pp. 88-93).

²⁴ This is, in fact, the form in which imperfect structural knowledge most often enters the theory of internal organization—and law and economics more generally. One knows the general form of the relevant categories, but one is qualitatively ignorant of the specific subcategories. For example, I might contract with you to build a jet airplane; but, while we both know (at least tacitly) what a jet airplane is, we are unable to specify *ex ante* all the attributes of the plane. It is impossible by definition to specify in a contract a complex product that does not yet exist. O'Driscoll and Rizzo (1985) discuss this problem in terms of the distinction between the typical and the unique features of an event. “We anticipate events as to their typicality,” they write, “but cannot fill in the ‘details’ beforehand. Neoclassical economics . . . has evaded the distinction between uniqueness and typicality. Those aspects of events are conflated when each possible situation or outcome is ‘condensed’ into a single scalar quantity. From this perspective we delude ourselves into thinking that we have fully characterized the event and thus eliminated the open-endedness of the future. In reality, we have characterized only a single typical feature of the event in question and ignored everything else.”

organization ultimately trace to the notion of structural knowledge? The answer, I would suggest, is that to see changes in structural knowledge as important to economic explanation is necessarily to alter the nature of such explanation.

I have been careful throughout this essay to highlight the logic of explanation that (implicitly or explicitly) lies behind the modern comparative-institutional approach to the theory of internal organization. That logic — once again — is of a comparative-efficiency sort: one postulates two or more discrete institutional alternatives and assesses their relative efficiency by considering each's transaction-cost properties. To isolate the transaction costs that make an observed organizational form the most efficient of those considered is, according to this implicit logic, to have explained not only the economic nature of that form but also why it is observed. What I would now like to suggest is that this logic of explanation necessarily becomes inappropriate if the possibility of changing structural knowledge is admitted into the analysis.

The methodological issues involved are rather complex, and I've attempted to deal with them more carefully elsewhere (Langlois 1982a). But it may be sufficient for present purposes simply to consider what it means for something to be efficient. In its most general sense, a structure (an organizational form, let us say) is efficient if it achieves a goal or end at the least cost possible — at the least sacrifice of valued resources. One organizational structure is more efficient than another if it achieves the same goal at a lower cost. In order to explain the nature of a structure in efficiency terms, then, one has, at a minimum, to be able to specify the goal with respect to which the structure is to be evaluated and the means on which it economizes in attempting to achieve the goal; to put it more simply, one has to specify a means/ends framework, a “problem” to which the structure is a solution. In order to explain the existence of a structure — efficient or otherwise — one has to do even more:

one has to specify a mechanism by which one believes the structure to have been brought about and maintained (Ullmann-Margalit 1978).

Standard neoclassical theory, especially in its more formal manifestations, provides us with a logic of explanation in which these two specifications are made simultaneously. The structure in question here is the whole of the price system; and the efficiency of that system is judged by its ability to allocate a specified set of resources in Pareto-optimal fashion according to a given set of preference orderings. The mechanism that (under appropriate circumstances) brings this efficient result about is the efficient behavior of all the economic agents in the system, who consciously seek to allocate their individual resources within the known and given commodity space so as to maximize their individual levels of utility. Admittedly, this is an odd sort of explanatory mechanism: rather than literally proposing a process by which the efficient result is achieved, it relies simply on showing that the efficient result is logically possible given the assumptions. My purpose, however, is not to criticize this logic of explanation on its own grounds, but merely to show that it is inapplicable under the assumption of changing structural knowledge.

In its most rigorous form, this neoclassical mode of explanation is entirely an axiomatic exercise. That is to say, conclusions about the efficiency properties of the system as a whole are deduced from axioms about the behavior of the individuals within the system. This approach is what F. A. Hayek (1937) long ago described as the Pure Logic of Choice. As he quite correctly pointed out, conclusions can be said to follow logically only from propositions that are simultaneously present in the same mind. Therefore, to draw conclusions about the efficiency properties of the system as a whole from axioms about the behavior of individuals is implicitly to see a system operating as if all relevant knowledge were given to a single “central” mind. An equivalent way to put this point, I believe, is that

the axiomatic approach necessarily implies or requires that all economic agents have complete and perfect structural knowledge.

An axiomatic neoclassical model can make statements about the efficiency of a structure because (a) it postulates a fixed and specified global allocation problem in terms of which efficiency may be judged and (b) it provides a picture of how — through the conscious efforts of agents to solve their own individual efficiency problems — this global allocation problem is [35] solved. Imperfect parametric knowledge creates no particular difficulties for this approach: both the global and the local optimizations are fully meaningful in a state-contingent probabilistic formulation. But imperfect or incomplete structural knowledge is quite another matter. If, on level (a), the analyst is aware of only part of the structural features of the global allocation problem against which he or she would judge efficiency, then the conclusions are necessarily suspect: the structure under study may be efficient relative to what is known, but grossly inefficient relative to what is unknown. Similarly, if, on level (b), the problem-structures of the individual agents do not overlap more-or-less completely with the global problem-structure, then one cannot logically (axiomatically) connect the individual problems with the global one. This is essentially Hayek's point.

In a sense, the problem I'm pointing to has not gone entirely unnoticed. It is actually the much-discussed absence-of-complete-futures-markets problem in another guise. Students of general-equilibrium theory have long recognized that the efficiency properties of the systems they construct depend on the existence of complete markets for all commodities under all possible future states of the world. This circumstance appears particularly troubling when one notices that there are clearly markets whose existence is logically

impossible: how could there be markets, speculative or otherwise, for commodities as yet undreamed of?

Most writings on welfare economics deal with the absence-of-complete- markets problem by simply ignoring it. When the problem does crop up in the writings of general-equilibrium theorists, it is most often portrayed as a message that the economic system has been shown to be inefficient. But this is a very misleading interpretation. A more accurate characterization would be that the incompleteness of structural knowledge makes it impossible to assess the market in efficiency terms. To suggest that the economic system is an evolving or learning process in which new knowledge is constantly being created is to suggest that there does not exist a fixed allocational problem against which efficiency may be judged. Efficiency, at least insofar as it implies a comparison with some postulated global allocation problem, is simply the wrong standard. The economy is not inefficient because of imperfect structural knowledge; it is simply a-efficient. The reality is not wrong because it doesn't fit the model; the model is inapplicable because it doesn't fit the reality.

Now, one may wish to argue that, for basic price-and-allocation theory in some of its forms, the difficulties of incomplete structural knowledge may be safely ignored, allowing one to go on talking meaningfully about efficiency in the usual way. But one cannot argue this with respect to the theory of internal organization — at least if one accepts my assertion that changing structural knowledge is at the heart of that theory.

What, then, is to be done? The answer, it seems to me, lies in recognizing that the neoclassical logic of explanation is not the only one available. Indeed, to talk about changes in structural knowledge is virtually to imply the alternative I have already suggested: an evolutionary logic of explanation. For to speak of evolution in a cultural (as distinct from a

biological) setting is necessarily to be concerned with learning and the production of new knowledge (Hayek 1967, 1973, 1978; Boulding 1978, 1981; Nelson and Winter 1982). And evolution in any context is about the nature of change in organized structures. [36]

What would be the effect of moving to this alternate explanatory framework? For example, would it require giving up the notion of efficiency entirely? The answer is: not necessarily. Efficiency has a place in an evolutionary theory, even if it is a more limited place than some economists seem to think; and it does seem to me possible to reinterpret the efficiency concept sensibly in an evolutionary context. At the same time, however, this reinterpretation immediately raises some theoretical issues that may have substantive implications for the way we analyze alternative institutional structures.

Evolutionary thought applied to economic matters is a pastime surely as old as economics itself; indeed, biologists probably got the idea from social scientists rather than the other way around. There have certainly been inappropriate and mistaken applications of evolutionary thought to social science, as much perhaps now as in the past. But there has also lately arisen a good deal of interest in a coherent and more sophisticated version of the evolutionary approach,²⁵ one that largely avoids the errors and excesses to which this line of reasoning is often heir. It is not my intention to justify this literature here, or even to describe the theory in much detail. But a brief outline of the basic ideas should illustrate how this approach differs from the axiomatic optimization/ allocation logic of explanation.

In a paradigmatic general-equilibrium model, what holds the world together is the conscious means/ends rationality of the economic agents. Not so in the evolutionary

25 I am thinking especially of the ideas of Hayek (1967, 1973, 1978) and Boulding (1978, 1981) on the philosophical level and the efforts of Nelson and Winter (1982) to transform evolutionary ideas into a viable affirmative research program.

paradigm. Here the growth and maintenance of economic organization is explained in terms of three factors: mutation (or variation); selection; and memory. It is the last two of these operating in conjunction that could be said to hold the world together in this model. Selection is the system-wide factor, analogous to (but, of course, ultimately quite different from) the postulated global allocation problem that connects things together in the neoclassical model. Memory is a property of the economic agents in the model, even if a somewhat passive factor normally seen in terms of habit, routine,²⁶ or the following of rules — rules that may often be unconscious or tacit in the manner of Michael Polanyi (1958).

None of this requires rationality of the means/ends sort; as a consequence, none of this requires the assumption of preexisting utility functions, of a fixed and given menu of alternatives, or, most to the point, of perfect structural knowledge on the part of the agents. What it does mean is that stable economic organization is possible even in the absence of such perfect structural knowledge.²⁷

Moreover, the mutation (or variation) function provides a mechanism by which new structural knowledge is brought into the system. The mutation factor is also the province of the economic agent;²⁸ and it is a function that, in contrast to the memory function, portrays the agent not only more active than the does the neoclassical alternative but also as quite

²⁶ Memory, as Sidney Winter alliteratively would have it, consists in “routines as genes” (Winter 1964, 1975).

²⁷ Indeed, as Heiner (1983) has argued from a quite different angle, stable patterns of behavior are not only consistent with generalized uncertainty but actually the product of such uncertainty.

²⁸ Mutation in economics often goes under the name of “entrepreneurship.” For theories of entrepreneurship compatible with this logic of explanation, see Schumpeter (1934, 1950) and Kirzner (1973).

fully as rational as the more conventional economic man — even if saying this requires that we rethink our definition of what it means to be rational.²⁹

How does “efficiency” enter into this logic of explanation? In away that is at once subtle and crucial. There is a long-standing debate in biology about the logical status of Darwinian theory. Some writers have claimed that the theory of biological evolution is tautological — that survival is [37] its own explanation. According to this argument, the “fitness” of an organism to its environment is defined by the ability of the organism to survive; and fitness is then used to explain why the organism in fact survived. Modern Darwinians respond to this charge by suggesting that survival is not in fact the appropriate definition of fitness; one can and should invoke an independent criterion — an efficiency criterion — to explain why an organism is able to survive in a particular environment. To these biologists, “certain morphological, physiological, and behavioral traits should be superior a priori as designs for living in new environments. These traits confer fitness by an engineer's criterion of good design, not by the empirical fact of their survival and spread. It got colder before the woolly mammoth evolved its shaggy coat” (Gould 1977, p. 42). This, then, is the role of efficiency in the explanation of alternative organizational forms: a transaction cost analysis provides the “engineer's criterion of good design” that suggests why a structure is well (or at least adequately) adapted to its environment. In other words, we need to reinterpret the meaning of a comparative-efficiency analysis in terms of what, in other disciplines, would be described as a kind of “functional analysis.” That this is in one

²⁹ The means/ends conception of rationality in neoclassical theory is grounded in the rationalist tradition that sees reason solely as involving logical reasoning from known premises. In contrast to this view is an equally hoary tradition in which “reason had meant the capacity to recognize truth. . . when [one meets] it, rather than a capacity of deductive reasoning from explicit premises” (Hayek 1967, p. 84). These two traditions are related to, if not exactly identical with, Herbert Simon's distinction between substantive and procedural rationality (Simon 1978). For a discussion, see Langlois (1982a).

sense an *a priori* standard of fitness does not by any means imply, however, that the evolutionary logic of explanation and the axiomatic efficiency approach are therefore equivalent or interchangeable. Herbert Simon has put the matter nicely.

In practice, it is very rarely that the existence or character of institutions are *deduced* from the functions that must be performed for system survival. In almost all cases it is the other way round; it is empirical observation of the behavior pattern that raises the question of why it persists — what function it performs. Perhaps, in an appropriate axiomatic formulation, it would be possible to *deduce* that every society must have food-gathering institutions. In point of fact, such institutions can be *observed* in every society, and their existence is then rationalized by the argument that obtaining food is a functional requisite for all societies. This kind of argument may demonstrate the sufficiency of a particular pattern for performing the essential function, but cannot demonstrate its necessity — cannot show that there may not be alternative, functionally equivalent, behavior patterns that would satisfy the same need (Simon 1978, p. 4, emphasis original).

An efficiency analysis of organizational forms is thus a kind of *ex post* reconstruction. It is an attempt to demonstrate the rationale for what exists by superimposing after the fact an axiomatic framework on a structure that could not have been predicted *ex ante* from such a framework. This reflects the cleavage between explanation and prediction that is characteristic of evolutionary theory (Scriven 1959).

What does it mean to talk about the relative efficiency of alternative organizational modes? Once we have reconstructed a means/ends framework to interpret in axiomatic terms the function served by an organizational form, we can then use the same framework to compare the efficiency of the alternatives. This should be a meaningful exercise so long as we use the same framework consistently — and so long as the framework we have chosen adequately captures the “environment” in question. (More on this point shortly.)

This does not mean, however, that we can ever portray an organizational mode as “optimal,” except perhaps in a very narrow sense of the term. Since [38] structural

knowledge is admitted to be incomplete in an evolutionary story, there must always remain alternatives yet to be invented that may perform the function in question more efficiently than do the known alternatives.³⁰ A functionalist interpretation of efficiency claims can never justify the contention that we live in the best of all possible worlds.³¹

Two implications.

It is important to notice that this functionalist reinterpretation is an “explanation” only in one of two possible senses. As I’ve already suggested, a logic of explanation operates at two levels. On one level it is concerned with the nature or function of a structure — with the design characteristics that sustain it in its environment. On another level, a logic of explanation is or can be concerned with the origin of the structure — with the mechanism by which it came into existence (Ullmann-Margalit 1978). On the first level, as we’ve seen, the comparative-efficiency approach, reinterpreted in functionalist terms, is relatively unproblematical. It is on the second level that problems begin to set in. Here I would identify two substantive difficulties: (A) the *disequilibrium* problem and (B) the *path-dependency* problem.

³⁰ Of course, one way to reconcile a world of imperfect parametric knowledge with a global-efficiency conception of economics is simply to define as a transaction cost any lack of knowledge or information that prevents the exploitation of a profit opportunity. Thus, for example, one could argue that any given organizational form (or anything else, for that matter) is necessarily optimal when all transaction costs are considered—for the fact that undiscovered superior alternatives are not in use is simply a reflection of the transaction costs of discovering those unknown alternatives. Needless to say, this closed version of the transaction-cost paradigm, which appears in the literature from time to time, is merely tautological. I am implicitly adhering to the open version of the paradigm in which, for reasons already suggested, transaction costs are independently defined and in which not everything impeding hypothetical optimality is *ipso facto* a transaction cost.

³¹ In saying this, let me also note that the evolutionary approach to analyzing organizational modes is no less antagonistic to certain forms of rationalist radicalism than to rationalist justification of the status quo. The reason is that, while we don't live in the best of all possible worlds, what exists is not therefore arbitrary. An evolutionary view recognizes the empirical character of economic knowledge and sees strong constraints on our ability consciously to remake complex social organizations at will (Hayek 1973.)

The first problem — which also operates on the functional level — is this: efficiency is necessarily defined relative to the environment in which the firm is operating. As a result, it is crucial that one specify the environment correctly in assessing the relative efficiency of alternate modes. If we take equilibrium to mean a state in which structural knowledge remains (perhaps temporarily) constant and disequilibrium to mean a situation in which relevant structural knowledge is changing, then the meaning of efficiency — and the nature of what is efficient — will depend upon whether we see the environment in question as an equilibrium or disequilibrium one. The mode of organization that minimizes the sum of production and transaction costs in equilibrium need not be the one that does so out of equilibrium. To the extent, then, that an organized structure faces a range of environments, the “efficient” mode will vary with time. Indeed, we need to be especially careful in judging organizational efficiency in terms of the environment we observe at any moment of time — for if that environment is likely to change, an organizational mode adapted to the environment of the moment may well be maladapted in some larger sense. This is the essence of the idea that there is a “tradeoff” between flexibility and efficiency (Loasby 1976; Klein 1977): that flexibility is in fact efficient in a changing environment, since an inflexible (albeit otherwise efficient) structure has a transaction-cost disadvantage in such an environment.

With this in mind, it may be useful to return to the arguments about structural knowledge that I offered earlier. If my interpretation is correct, then what students of internal organization are pointing to is that internal organization modes are more efficient than market-contract modes in situations where structural knowledge is incomplete — and therefore where the environment is changing. Conversely, market-contract modes may actually be more efficient in situations where the incompleteness of structural knowledge is

less important — and thus where the environment is relatively stable. This is a substantive implication that could presumably be subjected to careful empirical and historical analysis.

[39]

But there is more to the story. And it is here that the second level — the “originary” level — of explanation becomes important. For it is one thing to assert at a functional level that a mode of organization is most efficient under specified circumstances, and quite another thing to have explained why we observe a particular mode actually to exist. Which mode we observe will depend not only on its a priori superiority over other known modes but also on the specific historical sequence that the evolutionary process followed. For “the existence of such structures may in fact depend not only on [the] environment, but also on the existence in the past of many other environments, indeed on a definite sequence of such environments” (Hayek 1967, p. 75). A mode must not only be efficient now; it must also have been efficient throughout its history.

Conceivably, then, we might compare two institutional alternatives (like internal and market-contract forms of organization) and find neither with a claim to be more adapted to the environment in question; we might even find that the arrangement we do not observe is in fact superior on some grounds to the one we observe and wish to explain.

Consider the following scenario. Suppose, on grounds already suggested, that the internal organization mode is not superior to a market-contract mode in a stable environment in which states of knowledge are not changing and in which the categories of action are known to an agreed upon by all participants. Why then might we still observe internal organization modes rather than market-contract arrangements? One answer might be that, although internal organization is no more efficient — and maybe even less efficient

— in the current stable environment, economic history passed through periods in which structural knowledge did change rapidly; and internal organization modes were able to maintain a persistent structure during the passage, whereas the market-contract alternative did not “survive” these periods.³² And if there is no mechanism we can point to by which the failed modes are reestablished once equilibrium is restored, then the internal modes will continue to be observed even if less efficient in a functional sense.³³

This is not an entirely implausible scenario. We can think of independent (“good design”) reasons why one or another internal organization mode would be better able to adapt to changing circumstances. A mode of organization can be thought of as a kind of memory system. In the gun-making example cited earlier, for example, the decentralized market-contract mode “remembers” how to make guns. Like a firm, it evolved what organization theorists sometimes describe as an “operational program” — a way of doing things, a corpus of rules for action. But, unlike a firm, this pure market system lacks some of the higher-level functions of memory. To put it slightly differently, it lacks not so much the

³² This point (that disequilibrium may result in the selecting out of those who would otherwise have been most efficient in the ultimate equilibrium) has been made in a slightly different context by Winter (1964).

³³ The mechanism by which failed alternative modes might reestablish themselves would, of course, be entrepreneurship—economic mutation. As Alchian pointed out long ago, local search may not be an adequate mechanism to the extent — as seems likely in dealing with discrete institutional alternatives — that there are “non-convexities” involved in moving from one alternative to another (Alchian 1950); but this does not preclude a demonstration that search (or entrepreneurship more generally) of a nonlocal kind is at work. If one could show that it is not costly to try out failed alternatives from the past and that people are, in fact, continually trying out these alternatives, then the fact that a particular mode continues its dominance offers a far greater presumption that it is the most efficient of those known. But notice that this is an imminent argument, not a functionalist argument. Confusing the two levels of discourse—the functionalist explanation and the originary explanation—is a pastime pervasive in economics; this tendency can perhaps be traced to Milton Friedman's well-known instrumentalist defense of marginalism, which can be understood as an attempt to install as a methodological dictum precisely this confusion between levels of explanation.

ability to learn as the ability to remain an identified whole while learning — to “coevolve.”

Frank Knight saw the matter in a way very close to what I've just suggested.³⁴

When uncertainty is present and the task of deciding what to do and how to do it takes the ascendancy over that of execution, the internal organization of the productive group is no longer a matter of in difference or a mechanical detail. Centralization of this deciding and controlling function is imperative, a process of “cephalization,” such as has taken place in the evolution of organic life, is inevitable, and for the same reasons as in the case of biological evolution (Knight 1921 [1971, p. 268]). [40]

This “zones of disequilibrium” explanation is another substantive implication of looking at internal organization in a dynamic context; and it also calls for empirical and historical examination.³⁵

³⁴ I think cephalization rather than centralization is really the operative notion here. The issue Knight is getting at is flexibility — not central authority or planning in the manner of, say, Galbraith. For, as Hayek notes, neither the ability to learn nor the appearance of purposiveness depends quite as strongly on centralized direction as one might think. “There is,” he writes, “no reason why a polycentric order in which each element is guided only by rules and receives no orders from a centre should not be capable of bringing about as complex and apparently as “purposive” an adaptation to circumstances as could be produced in a system where a part is set aside to preform such an order on an analogue or model before it is put into execution by the larger structure. Insofar as the self-organizing forces of a structure as a whole lead at once to the right kind of action (or to tentative actions which can be retracted before too much harm is done) such a single-stage order need not be inferior to a hierarchic one in which the whole merely carries out what has first been tried out in a part. Such a non-hierarchic order dispenses with the necessity of first communicating all the information on which its several elements act to a common centre and conceivably may make the use of more information possible than could be transmitted to, and digested by, a centre” (Hayek 1967, p. 74).

³⁵ In fact, there is reason to think that the gun-making case cited above may itself provide a good example. As Stigler remarks, “[t]he later history of the gun trade, in which American innovations in production techniques were revolutionary, suggest[s] that the organization in Birmingham was deficient in its provision for technical experimentation.” [Stigler (1951, p. 193n).] I should also note that some authors have in fact focused on innovation in explaining internal organization; see especially Teece (1982a).

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