

ECONOMIC RESEARCH REPORTS

COMPETITION AND DISCOVERY

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R.R. #82-23

October, 1982

**C. V. STARR CENTER
FOR APPLIED ECONOMICS**



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NEW YORK, N.Y. 10003**

CHAPTER SIX

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From Knowledge and Time : Foundations of
Austrian - Subjectivist Economics

September, 1982



A Parable on Competition

Consider a sports game for which spectators and participants agree that the rules are fair. The judges of individual sports events profess, however, to know beforehand what the outcome of individual contests should be. Failure of the sports events to produce the predicted outcome results in condemnation of them by these judges. Judicial nullification sometimes involves substituting the preferred or predicted winner for the actual winner of the contest. Sometimes, however, the judges require that the sports event be replayed over and over again, until the "correct" outcome is produced. Plays are called back, races rerun, and contests repeated not because of untoward conduct or fouls committed by participants, but solely because the "wrong" outcome results. If contrary to judicial expectations, a particular participant or team persists in winning, that person or team is handicapped or perhaps even forbidden from playing in the future. The judges do assert that they are enforcing rules, but the evidence that rules have been broken is inferred from the fact that other than the predicted winner came out first in the game. Some creative judges produce theories about what unfair activity must be going on to produce the unwanted results. These theories generally involve, however, hypothetical actions not observed by anyone. Observable behavior that is blamed for bad outcomes cannot be distinguished by participants or spectators from approved behavior.

Clearly no such sports contest exists. The enforcement of such rules would made a mockery of playing the game or

running the race. Virtually everyone recognizes that the manner of a sports event cannot be defined apart from who finishes first or scores the most points. "Winning" means nothing but playing fairly and coming in first. "Playing fairly" is defined before the fact in terms of observable behavior during the contest, and not, of course, in terms of after-the-fact outcomes. Teams or individuals scoring highly are not penalized for doing so, and certainly not implicated in cheating merely because they frequently win by large margins. There is no sports foul of "excess points."

Indeed, sports contests are played, in part, precisely because we cannot and do not know before the event who is the better player or team. Prior expectations of winners and losers are frequently falsified. To know the outcome with certainty would be to render the playing of the game unintelligible. To rig the results after the fact would be to perpetrate an injustice on players and spectators alike.

We claim that this procedure, which would be rejected out of hand for sports competition -- or any other kind of competitive "race" in life, including that for most scientific analysis -- is precisely that adopted by the vast majority of economists in thinking about competition. What would be an obvious paradox is suppressed by redefining "competition" to mean nearly the opposite of the behavior and phenomena it ostensibly denotes.

In this chapter, we will argue that economic competition has more in common with other competitive activities in life than it has with economists' standard conceptualization of

economic competition. Competition is most fruitfully viewed as a process rather than a state of affairs. Viewing competition in static terms causes numerous analytical problems, some of which we shall highlight in this chapter. Among other things, static competition theory ignores the fact that only if there is a rivalrous, competitive process will the desirable normative properties of competition be produced. Thus, statutory monopolies are objectionable not only because they produce a given product at higher prices, but also because they fail to produce the range and quality of products preferred by consumers.

More generally, we argue that the theory of perfect competition denies the very reality it purports to study, is a poor predictive theory, and is untenable in normative analysis. As well as offering a critique of current approaches, we present our own approach. We shall be concrete and offer examples. While we recognize that not all our examples involve in-depth analysis, we believe that only by offering numerous examples can we suggest just how unsatisfactory the dominant theory of competition is. Moreover, in many cases we view these problems as exemplary of the future research agenda of a process theory of competition.

Perfect Competition

It is well-known that in economic theory "competition" means the opposite of its meaning either in ordinary language or in commonsense economic discussions of competition. This ironic use of "competition" is somehow seen as a virtue rather than a vice. When pressed, theorists argue that

perfect competition teaches us about relationships among economic variables in competitive equilibrium and about certain normative properties of competition. Before examining these professed benefits, we shall look at what is lost by using the theory.

Perfect competition is a theory of states, not of processes; it tells us nothing about the adjustment from one competitive equilibrium state to another. In fact, if we consider what we know from general economic theory, we must be pessimistic about the system's ability to move from one hypothetical equilibrium state to another. Equilibrium positions are not path-independent. Inter alia, false-trading produces wealth effects, which generate a new implied equilibrium, different from the original one.

The theory not only tells us nothing about adjustment processes, but also, when taken seriously, implies that there ought to be no process of adjustment at all [supra, chapter 3, pp.00-00.] Once a new equilibrium is known, agents will move to it immediately.

Every economist recognizes, of course, that in practice there are imperfections in knowledge, adjustment costs, and indivisibilities in the world. This limited recognition of real world problems shows up as search theories, transaction cost analysis, and U-shaped cost curves. Let us focus on the latter for the movement.

In Walrasian general equilibrium analysis, the auctioneer prevents false-trading. In intertemporal versions of the model, the prices set are long-run equilibrium prices.

Recognizing the reality of imperfect adjustment to disturbances, economists have introduced partial adjustment models. The Marshallian market-day, short-run and long-run period analysis is a useful, simple variant of partial-adjustment models. In textbooks, the Marshallian story is told in terms of U-shaped average cost functions and equality of short-run marginal cost and marginal revenue. None of this story is consistent, however, with the general equilibrium model to which it is supposedly an amendment. The Marshallian analysis involves partial adjustment and false trading, while the Walrasian analysis involves full adjustment and no false trading. The two models do not belong together, for they tell different stories about entirely different worlds [Leijonhufvud, 1974]. Yet surely a "competitive model" ought to encompass competitive activities.

The root problem is that competition is continuous process and not a set of conditions. As Hayek observed of competition, its "essential characteristics are assumed away by the assumptions underlying static analysis" [Hayek, 1946, p. 94]. The theory is comparative static, focusing on beginning and end points. Economic agents are interested in neither the beginning nor end points, but in coping with never ending adjustments. The so-called theory of (perfect) competition analyzes the state of affairs or equilibrium conditions which would exist if all competitive activity ceased. It is not an approximation but the negation of that problem.

All theories abstract from part of reality. The

theorists must determine in each case the appropriate degree of abstraction. What is essential and permanent to the phenomena ought to be part of the analysis. It would, for example, be pretty poor economic theory that abstracted from scarcity.¹ All genuinely economic, as opposed to purely computational, problems arise because of the passage of time and concomitant changes in knowledge and the data. Economics must analyze the process of adaptation as surely as it analyzes scarcity. Under some conditions, this process is competitive. We need, therefore, a theory of the competitive process. Neoclassical economics contains no such theory.

The orthodox theory of competition postulates a situation in which a large number of buyers and sellers of a homogeneous good transact in an environment of free entry, parametric pricing, and perfect knowledge.² We have already added our own criticisms of perfect knowledge to those of numerous other authors. Here we would emphasize that the problem of incomplete knowledge and the necessity of adaptation exist only to the extent that the data change unexpectedly. "...Economic problems arise always and only in consequence of change. So long as things continue as before, or at least as they were expected to, there arise no new problems requiring a decision, no need to form a new plan" [Hayek, 1945, p.82].

The existence of scarcity necessitates agents' making a set of choices -- a plan. In a static world of scarcity, however, each individual would need to form only one plan per lifetime. Plan revision occurs not because goods are scarce but only because of changes in the environment (and in the

individual agent himself³). If the static model were a close approximation of reality, we would have exhausted our subject long ago. There is just so much that can be said about the Pure Logic of Choice in an unchanging world. Yet in the theory of competition, which ought to be preeminently a theory of change, the static model of pure competition reigns supreme.

Change manifests itself as heterogeneous expectations and heterogeneous tastes. Neoclassical economic theory treats product differentiation as an equilibrium phenomenon, the outgrowth of consistent plans between consumers and producers. In Austrian economics, product differentiation is the outcome of a process in which producer-entrepreneurs try to mesh their plans with those of consumers. Because of changing conditions (including but not limited to changes in consumer tastes), producers are not sure what buyers want. By a process of trial and error, producers change non-price variables in an attempt to discover how best to serve consumer wants. This producer-generated trial and error process is likely also to generate consumer experimentation with heterogeneous offerings. The observable result, which is not part of anyone's explicit intention, is "product differentiation." The attempt to discover by trial and error the actual set of consumer tastes is bound to produce greater diversity in product offerings. Uncertainty and a high degree of competition, not market power and imperfect competition, produce this result.

The treatment of product heterogeneity is an instance of a more general issue. Concepts and problems whose existence derives from change and the passage of time are often analyzed in static terms. The positive analysis is deficient, and will almost inevitably mislead the analyst in policy applications. We say more about this issue in what follows.

The Discovery of OpportunitiesEquilibrium

In our analysis of competition, plan coordination is the norm. As we have seen, the plan coordination concept was the outcome of Hayek's early attempt to reformulate equilibrium analysis for a multi-person economy in time. The theorist's research program would then consist of analyzing those forces tending to bring the system to equilibrium. This program contained the "empirical element" in economics [Hayek, 1937, p. 44]. The Pure Logic of Choice is abstract and deductive. The degree to which an economy actually tends toward complete plan coordination ("equilibrium") determines the applicability of equilibrium models to real world economies.⁴

The focus on forces tending to equilibrium helps explain the concern with entrepreneurship in modern Austrian work. The entrepreneur is the active coordinating agent in market economies. Prices are signals or indicators, but not unerring guides to economizers. Institutions provide a background for decisionmaking, which may set practical limits to the divergence of expectations. But it is entrepreneurs who are alert to opportunities, and, indeed, whose creativity is the very source of many of these opportunities.⁵ In equilibrium, there can be no profit opportunities. But only by acting on their hunches and forecasts, so as to grasp profits, could entrepreneurs bring about a situation in which equilibrium is approached.

Hayek has recently moved beyond his original position on coordination and equilibrium. He had defined as an equili-

brium a situation in which there is both ex ante plan consistency, and no information disruptive of their plans that agents are bound to learn in the course of executing those plans. Exogenous disturbances might occur before these plans are executed which upset the equilibrium. As long as agents did not themselves bring about these disturbances by the very execution of their plans, the plans were coordinated and consistent. Endogenous market forces would then tend to bring the system to the original equilibrium position.

In his work on entrepreneurship, Kirzner has consistently adhered to Hayek's original view. Yet by focusing on entrepreneurship we can understand better the reasons that surely entered into Hayek's revised approach to competition, coordination, and equilibrium. The fundamental problem is that the "tendency to equilibrium" view does not take time seriously. The latter is, of course, as serious an internal criticism as one could levy against an Austrian analysis.

Process

Competition is a dynamic process, a process in time. Since, as we have seen, knowledge must change with the passage of time, individual agents will alter their plans. This changing of plans disrupts the plans of other agents. Conventional learning models are, however, "clockwork" models, whose most significant characteristics have been succinctly described by Littlechild [1977, pp. 7-8]:

The agents are equipped with forecasting functions and decision functions to enable them to cope with uncertainty. Indeed, the agents are these functions. But though their specific forecast and decisions may change over time in

response to changes in economic conditions, the functions themselves remain the same. The agents never learn to predict any better as a result of their experience. Nothing will ever occur for which they are not prepared, nor can they even initiate anything which is not pre-ordained. They are clockwork Bayesians, would up with prior distributions and sent on their way, to attain eventually, if circumstances permit, that everlasting peace in which they never need to move their posteriors.

The theory-problem is modeling competition as a continual process. One could formally model the economy as a clockwork mechanism, and then hypothesize a never-ending stream of exogenous shocks wrought by entrepreneurs outside the system. In such a model, the passage of time would not be accompanied by learning. To prevent the system from "winding down," one would need to bring in the entrepreneur as a deus ex machina. In his Theory of Economic Development, Schumpeter chose this latter course. The circular flow is then the natural state of the economy, in which it settles unless disturbed by disruptive entrepreneurs. The Schumpeterian gambit maintains the Newtonian conception of time and places the entrepreneur outside the system. Yet surely neither entrepreneurship nor learning ought to be completely exogenous (i.e., unexplained) in a process analysis, even if one accepts that there are exogenous components to both.

In "Competition as a Discovery Procedure," Hayek explicitly integrated true learning (i.e., changes in the learning functions themselves) into a process theory [Hayek, 1968]. He brought the entrepreneur in from the shadows and made him part of the economic system, presenting a significantly different view of the function of competitive institutions.

He treated a competitive market as a spontaneously evolved set of institutions and customs facilitating information acquisition. To simplify only slightly, everything assumed to be data in orthodox constructions is the object of a trial-and-error process in Hayek's.

Knowledge and Competition

There are five general characteristics of knowledge with which a Hayekian view of competition is concerned. Knowledge is (1) private, (2) empirical, (3) often tacit, (4) not all gained through price signals, and (5) often the source of surprise. Each of these characteristics is important, and together they distinguish a process from a static conception of competition.

(1) A large and significant part of advanced economic theory explicitly or implicitly rejects the privacy of knowledge. The strong version of the Efficient Market Hypothesis explicitly denies that any knowledge would remain private, and not part of the data of the system. With relatively few exceptions,⁶ Rational Expectations theorists fashion models as though information available to anyone is available to all. While it certainly would be an exaggeration to suggest that privacy of knowledge is generally accepted, there is nonetheless some recognition of this issue in other areas of theory.

In the literature on localized information,⁷ some knowledge is private and not datum. Privacy models can be used to analyze numerous issues, including the ability of individuals to exploit the knowledge on the market. We

consider this literature to be salutary, and we have no disagreement with it as far as it goes. Our problem with the direction it has taken comes out below in our discussion of the other characteristics of knowledge.

(2) The knowledge sought by economic agents is empirical in the following sense. They are primarily seeking "knowledge of the particular circumstances of time and place" [Hayek, 1945, p. 80]. When acquired, this knowledge does not consist of abstract scientific propositions, which form the basis of logical deductions to certain conclusions. Empirical knowledge consists of information of temporary and fleeting significance, which may be factual (i.e., profitable) only so long as others do not also know it. Almost any profit opportunity fits this characterization.

The value of incomplete information partly depends on the processor of the information. Each actor must exercise judgement about information and its place in his overall plan. What an agent ought to do cannot be determined by an outside observer possessed of different information, judgments, and tastes. There is, consequently, no uniquely rational or "correct" course of action, as may be the case when dealing with a scientific-deductive problem. This latter point requires emphasis, given economists' inclination to pronounce on "the rational" course of action in numerous situations.

In a situation of given means and given ends, there may be only one course of action that will maximize the relevant objective function. This would be true by virtue of our con-

struction of the problem. We may choose to label this cause of action "rational." We can deduce the "rational" or "correct" action only because we have converted an empirical or trial-and-error learning problem into a logical or deductive problem. This conversion is permissible only if all required information is simultaneously available to the decisionmaker. It is totally erroneous to conceive of discovery and decisionmaking that involves trial-and-error discovery of incomplete information as though it were a scientific problem, about which agents "theorized." Hayek stated the point clearly and concisely:

Implication is a logical relationship which can be meaningfully asserted only of propositions simultaneously present to one and the same mind... Only to a mind to which all these facts were simultaneously known would the answer necessarily follow from the facts given to it. The practical problem, however, arises precisely because the facts are never given to a single mind, and because, in consequence, it is necessary that in the solution of the problem knowledge should be used that is dispersed among many people.⁸

(3) The nondeductive or nonscientific quality of much economic knowledge is obviously related to its privateness. Both are also related to the tacit quality of much economically important knowledge. In all areas of human endeavor, individuals employ knowledge, which either they are not aware they possess or cannot characterize precisely enough to communicate to others. In philosopher Gilbert Ryle's terminology, they "know how" to do something but do not "know that" so and so is true of what they do [Ryle, 1949].

Scientific progress occurs as the stock of interpersonal

and communicable knowledge increases. In this regard, however, scientific knowledge and progress are poor models of economic knowledge and progress [Sowell, 1980, pp. 8-11]. Thus, tacit knowledge may take the form of a skill or may be embodied in a custom or unarticulated rule of behavior. Bicycling and swimming are two examples. Relatively few accomplished at either understand the principles involved, or are even adept at teaching others how to ride or swim. Bicyclists and swimmers know how but not that. They may very well be fit subjects for imitation. Apprenticeship, not a reference work or university short course, is the learning model. Michael Palanyi [1962, p. 49] illustrated the theoretical point with reference to swimming:

...The decisive factor by which the swimmer keeps himself afloat is the manner by which he regulates his respiration; he keeps his bouyancy at an increased level by refraining from emptying his lungs when breathing out and by inflating them more than usual when breathing in; yet this is not generally known to swimmers.

Two important implications follow from the above. First, discovering tacit knowledge involves time-consuming processes that may never be successful. Other market participants may not be able to discover the source of reasons for an entrepreneur's success. His profits may accordingly persist for a substantial length of time. Second, some of what individuals do and why they do it cannot be successfully communicated or explained to third parties. Third party observers ought not to expect agents to be able to rationalize their conduct. We will develop some of the futher implica-

tions of this for public policy on competition and monopoly.

Since much information is tacit and cannot be communicated, even in equilibrium not everyone will know everything. Economic systems do not move toward a situation in which information is fully disseminated, at least not explicitly. Some knowledge will remain private and some profits and rents will persist, yet no one will have an incentive to alter his behavior.

The inability of agents fully to communicate all that they know underlies the Mises-Hayek critique of centralized resource allocation. The problem of the tacitness of private knowledge is separate from the issue of incentives to communicate valuable knowledge to others. This part of the Mises-Hayek critique was not understood by their antagonists in the long socialist calculation debate. The Lange-Lerner "solution" simply overlooks the point.

(4) When it comes to the role of prices in allocating resources, the Austrian message seems to have been learned almost too well. The proposition that "the price system [is] a mechanism for communicating information" [Hayek, 1945, p. 86] plays an especially important role in the localized information literature. But the context in which Hayek presented the idea has been forgotten. The proposition has been transformed into the entirely different one that "nothing but" price signals communicate information on markets. Its corollary is that unless price signals accurately reflect equilibrium scarcity values, we cannot or ought not rely on them.

A world in which prices were always at their general equilibrium level would be a world in which prices were not needed. To understand this point, consider the function of the Walrasian auctioneer. He centralizes information and insures that individuals do not act on disequilibrium data. Equilibrium prices are generated via the tatonnement process. No real time passes and no false-trading occurs. Though nominally in time, the Walrasian world is really static. The most interesting feature, however, is the centralization of information. Formal economic theory provides no argument for decentralization. Based on general equilibrium theory, perfect competition theory is more applicable to centralized than to decentralized economies. Static models of centralized information render real competition superfluous and literally wasteful. In this world, we can forget prices and just have the central control collector of information issue production orders instead. The prices of general equilibrium theory do not provide information of the type we have been discussing. These prices are simply statements of equilibrium rates of tradeoff.

What of the idea that prices guide behavior? First, prices are useful guides or signals because, and insofar as, they reveal discrepancies, previous maladjustment, and errors. It surely misses the point to ask if they are now "correct." Prices reveal what people want relatively more urgently now, not what they would want in a hypothetical and unattainable equilibrium. No known system accomplishes the latter, and it is pointless if not misleading to make this a normative reference point.

Second, prices and markets function as part of a social system, not in isolation. A social system generates many kinds of signals and rules besides prices. Unless all these other guides are superfluous, it is erroneous to suggest that prices alone are sufficient. A theory of passive response to prices and only to prices is not a theory of human action, but a physics of automatons.

Nonprice constraints are as much part of a decentralized economy as are the prices they help generate. These constraints are reference frameworks and orientation points, in terms of which actors form expectations. In reading the formal literature on prices, one wonders whether theorists have forgotten that prices are formed on markets composed of contracts, rules and customs, which are part of the constraints and basis for observed behavior.⁹ The tendency in the industrial organization and applied price theory literature is to view nonprice constraints as either extraneous or suspicious intrudings on "competition." We are arguing, on the other hand, that they are necessary institutions and accompaniments to markets. For example, it is strictly impossible to imagine a "price system" devoid of contracts and property rights. Yet much of the focus of the applied literature involves casting suspicion on all nonprice constraints to behavior (e.g., resale price maintenance). There is a presumption against them, and agents must justify their existence. We think this attitude follows from the presumption that prices "ought to" allocate resources, because they do in the competitive model. Not prices but people allocate resources, and flesh and blood human actors depend on

all these nonprice variables in the decisionmaking. (We say more on these issues in the next chapter.)

Third, to varying degrees agents are endowed with entrepreneurial ability. Entrepreneurs do not merely respond to but also invite change. They outguess market prices when these prices do not seem consistent [Rothbard, 1962, II: 464-69].

Whether we call this entrepreneurship "a capacity to find out particular circumstances" [Hayek, p. 182] or "alertness" [Kirzner, 1973, pp. 65-59], it is a sine qua non of a market economy. Yet this "driving force" of market economies is absent from models of perfect competition. Schumpeterians and Austrians have tried to fill this gap with theories of entrepreneurship (below, this chapter).

(5) Competitive market processes must produce results surprising (at least in part) to market participants and observers alike. Any interactive social process produces unintended and hence unforeseen results. This will be true if for no other reason than the conflicting goals of diverse members of society. Whenever there is goal conflict, there must be a social mechanism to reconcile these conflicts. The mechanism may involve peaceful or nonpeaceful reconciliation. It may entail either private or collective action. If private, it may involve market or nonmarket approaches. Regardless of the mechanism, some agents must experience disappointment and revise their plans. This plan revisions must involve their making other than the choices they had

originally to make.

The outcomes of social processes are unintended for three interrelated reasons. Reconciliation of conflicting plans is the first reason. Second, there are always unintended by-products to individual actions in a society. Acting individuals inevitably produce results that were, in Adam Smith's phraseology, "no part of their intention." This realization is surely the basis for any social theory and is, in any case, the core principle of modern economics [Buchanan, 1976; O'Driscoll, 1977]. If social processes were nothing but the intended outcome of human action, social science could be dispensed with and replaced by traditional statecraft. We, or a sovereign acting in our behalf, could literally will the social and economic results wanted. We cannot imagine any role for economic theory or social theory of any kind in such a world. An interesting analysis of attempts to engineer ex ante economic and social outcomes necessarily involves specifying unintended consequences of human action. For instance, the results of imposing below market rental prices on housing units is an example of the principle involved. The intended outcome (plentiful and cheap housing) is the given for the problem. The analysis consists in deducing the unintended outcome (expensive and depleted housing stock). What is true of economic theory is likewise true of sound sociological and political analysis. Each discipline studies the unintended consequences of human action.¹⁰

Third, actions are not merely "additive." Increasing numbers of buyers and sellers of a good typically result

in not merely more production and trade, but also a more highly developed market for the good. If increasing numbers of traders seek liquidity and try to economize on holding of inventories of real goods, they may succeed not only in achieving their goals but in facilitating the emergence of a medium of exchange [Menger, 1892]. Immigrants seeking a better life may not only discover greener pastures, but also help mark out a trail that others will follow.

The unintended consequences of human action must often be as surprising to the theorist as they are to market participants. Similarity of problems renders pattern prediction feasible (as in the rent control case). The seeming precision of such predictions masks basic theoretical ambiguity. A myriad of outcomes are possible. Will the controls be enforced or not unenforced? Evaded (how?) or not evaded? Will the government eventually subsidize enough construction to meet the excess demand (Sweden) or not (the U.S. and U.K.)? The attempt to predict precisely the unintended by products of human action would involve, inter alia, a predictive theory of human institutions. Nothing short of discovering the "laws of history" would make this endeavor possible. Past efforts in this area have been conspicuous failures. Our only prediction of the future is that this record will continue unchanged.

The final element of surprise concerns expectations formation. We have more to say on "objectivist" theories, like Rational Expectations, in the chapter on money. Here we simply observe that a subjectivist approach emphasizes the diversity of expectations. This diversity is a function both of the diversity of human beings and the effects of change and the

passage of time. Prereconciliation of plans and forecasting of the future would necessitate each individual's predicting the mental states and choices of large numbers of unknown individuals, whose decisions affect his environment and his choices. No expectational theory that either entails or assumes such an ability can or ought to be taken seriously. Theories that do entail or assume this ability violate the basic requirements of a subjectivist and methodologically individualistic analysis. They fail to take differences among individuals seriously. The theories proceed "as if" there were only one decisionmaker. These theories produce unintelligible results when applied to decentralized economies. Yet, to recapitulate, the modern theory of competition assumes centralized information (in the auctioneer), and (usually) uniformity of expectations. It would be only a slight exaggeration to say that neoclassical economics has produced an elegant static theory of centralized resource allocation, but no theory of competition in a decentralized economy.

Process Theories and Normative Economics

A theory of competition as a process must incorporate the passage of time, change and genuine learning. Such a theory will necessarily be at odds with static theories of competition. These theories equate competition with the attainment of certain conditions, the existence of certain market structures, and the presence of stereotypical behavior (e.g., price taking) by transactors. If markets fail to replicate these conditions or to produce certain results (e.g., $P=MC$), then this is taken as imperfection of competition. This conception underlies the proclivity, illustrated in our parable,

to condemn actual market outcomes.

Contrast this with Hayek's recent characterization [1968 p. 180] of competitive markets:

...Competition is valuable only because, and so far as, its results are unpredictable and on the whole different from those which anyone has, or could have, deliberately aimed at. Further, ... the generally beneficial effects of competition must include disappointing or defeating some particular expectations or intentions.

If competition serves a social purpose, it must produce something that we could not have without its absence. To the degree that competition does what we could have equally cheaply in its absence, it is wasteful. If competition is not discovery and invention, then it is nothing. Following Hayek, we have argued that competition discovers opportunities that would otherwise go unnoticed and undiscovered. Competition generates spontaneous discovery processes, whose exact course is unpredictable. Competition not only discovers unsatisfied preferences and generates new products to satisfy these, but it constantly creates new economic forms, customs and structures. It is not what competition does to fulfill our expectations that recommends it; instead, it is what competition does but we would not have expected it to do that recommends it.

Insofar as process theorists approve or defend competition their arguments rest on different grounds than those of standard welfare economics. The fundamental theorems of static welfare economics are simply irrelevant to competition viewed in a process sense. There are three issues involved here. First, the use of "competition" differs in the two approaches. The

word refers to a process in the process approach and to an end state in the other approach. Indeed, in the process of competition all the equalities on which so much emphasis is placed in welfare economics are almost necessarily violated.

Second, process analysis rests its case for or against competition on, inter alia, such concepts as plan consistency and fulfillment of expectations. Optimality is foreign to any process view [McCloskey, 1982, pp. 181-86]. By contrast, static welfare economic propositions depend critically on attainment of optimality conditions.

Third, the process view emphasizes discovery, surprise and unintended outcomes of competitive activity. Standard welfare analysis involves pre-reconciled choices under known conditions producing predictable (and predicted) outcomes. Before agents can trade, prices must be at equilibrium values.¹¹ In effect, the outcomes of trade must be known by agents before the trades are consummated. There are no unintended consequences here. Further, the analyst-observer knows the outcome, in the guise of well-known equalities of values at the margin. For instance, market results approximate those of pure competition if they result in given wants being satisfied at least cost. That is, homogeneous goods are produced and sold at a price equal to social marginal cost. A competitive process that discovers and, yes, even generates new wants, has nothing to recommend it to, and much to find fault with in static welfare economics. The process creates "dependence effects" and changes the commodity space, as well

as violating marginal conditions.

We do not want to belabor this point, but even causal inspection of the literature reveals a systematic conflation between general equilibrium theory and classical arguments in favor of free competition or "laissez-faire." Consider the following argument of Kornai [1971, p. 349].

The modern equilibrium theory is nothing else than a mathematically exact formulation of Smith's "invisible hand" which harmonizes the interest of egoistic individuals in an optimal manner. At the time of Smith,...., this description of the functioning of a capitalist economy was not unrealistic (though not exact either). More than a hundred years were required for Smith's intuition to be expressed in a faultlessly exact form; by the time it was achieved, it became utterly anachronistic.

Or compare Hahn [1973, p. 324]:

When the claim is made - and the claim is as old as Adam Smith - that a myriad of self-seeking agents left to themselves will lead to a coherent and efficient disposition of economic resources, Arrow and Debreu show what the world would have to look like if the claim is to be true. In doing this they provide the most potent avenue of falsification of the claims.¹²

In fact, Smith's defense of competition involves a theory of unplanned or spontaneous order. This tradition, in which Smith forms a middle link between the scholastics and natural law theorists on the one hand, and modern theorists like Mises and Hayek on the other hand, is an alternative to modern general equilibrium theory and not an early or crude anticipation of it. A theory of evolved orders is not a theory of optimality, equilibrium or efficiency. A theory of evolved order is a process not an end state theory. Social

efficiency or global optimality concepts are foreign to theories.

It is, moreover, anachronistic to attribute modern welfare concepts to eighteenth or even to most nineteenth century writers. No such concepts existed yet. Many modern interpreters apparently believe that Smith, et al., "must" have been groping toward modern welfare analysis, but lacked the necessary training in calculus to articulate their views. Perhaps these interpreters can think of no other argument favoring competitive systems. Nonetheless, careful reading of The Wealth of Nations provides little support for the thesis that Smith was a crude neoclassical welfare theorist.

First, Smith wrote of advancing (not maximizing) the material well-being (not utility) of the common man (not society as a whole). He thus frequently advocated uncompensated property rights transfers, as when he recommended removing monopolistic trading privileges for the benefit of consumers and the detriment of the monopolists.

Second, Smith relied heavily (though not exclusively) on arguments in terms of rights and liberty. For example [Smith (1937, pp.121-22)].

The property which every man has in his own labour, as it is the original foundation of all other property, so it is the most sacred and inviolable. The patrimony of a poor man lies in the strength and dexterity of his hands; and to hinder him from employing this strength and dexterity in what manner he thinks proper without injury to his neighbour, is a plain violation of this most sacred property. It is a manifest encroachment upon the first liberty both of the workman, and those who might be disposed to employ him.

(Smith, 1937, pp.121-22)

Anyone who misses this theory in Smith is not a careful reader, and has also missed an important part of the Smithian case for competition. Indeed, in this regard Smith is stereotypical of the classical advocates of free and competitive markets. Arguments in terms of liberty formed important parts of their case. None fit into standard welfare analysis. This "libertarian" element represents a separate and distinct argument. Paralleling the common law, liberal political economy justified outcomes, in part, because they resulted from a system of voluntary trade and political freedom. Economic and political freedom were values in themselves, apart from whether the results of free competition mimicked the predictions of economic theory.

Our major point is not doctrine-historical (though we are confident of our interpretation), but substantive. Any dynamic analysis of competition must have criteria alternative to those of static welfare theory. It would be strictly inconsistent to fall back on static welfare theory in assessing markets. Whatever can be claimed on their behalf must depend on the alternative criteria. Elements of a normative analysis are presented in the next section.

Dynamic Equilibrium

Theorists have traditionally preferred exact and deterministic equilibrium concepts. Indeterminism and unpredictability show up in fitting or applying the concept and analysis to concrete problems. By emphasizing the unpredictability and indeterminateness of social process, we are not raising a new problem so much as we are proposing a new solution. As Coddington (1975, p. 156) has phrased it, "when it comes to being put to some use, the static method abandons its own formalisation anyway. The choice then becomes less dramatic: between abandoning formalisation openly or abandoning it in a surreptitious way." We have argued (above) that our alternative permits theorists to incorporate time and change into models in a meaningful way.

The passage of time makes it inevitable that some expectations will not be met, some plans not fulfilled. Some disappointment of expectations and a degree of frustration in implementing plans are inevitable in any social system. No set of policies or institutions can insulate us from the effects of time passing. The relevant question is how different institutions and policies affect individuals' adaptation to unexpected outcomes.

Once we abandon the static framework, our theoretical and policy focus change. Owners of existing entitlement always prefer policies that insulate them in so far as possible from the undesirable effects of a changing environment. These preferences may sometimes be justified by a static analysis (e.g., an externalilty or a favorable

"equity-efficiency" tradeoff). These claims automatically carry diminished weight in a nonstatic framework. Policies that protect existing entitlements inhibit adaptation of agents to past and future changes. To the extent that this happens, the probability that a market participant chosen at random will be able to fulfill his plans diminishes. Even those protected owners of current entitlements will find adaptation in the future more not less difficult because of their seeking current protection. Thus "sick" industries become sicker not better as they are protected more thoroughly.¹³

As we saw in the previous chapter, exact coordination of individuals' activities is not only practically impossible but also conceptually self-contradictory. Acting takes place in real time, and, as time passes, agents learn and alter their behavior. Complete coordination of activities is thus not a state toward which social systems are moving. We can, however, meaningfully postulate a tendency toward pattern coordination (a true dynamic equilibrium).

Pattern coordination consists of coordination among the typical but not the unique aspects of individual behavior. In this context, two variants of a normative criterion suggests themselves. The first variant ranks different pattern equilibria, while the second deals with properties of the transition process from one equilibrium to another.

With respect to the first case, it is important to realize that any given instance of concrete behavior can be described in a myriad of ways. Many patterns or typical

features can in principle be identified in a set of actions. The same vector of actions can thus comprise numerous pattern equilibria. Some are, however, "better" from agents' perspectives than are others. To refer to the illustration of the previous chapter, Professor B may identify several patterns of his coauthor's (Professor A's) behavior. The realization that A comes into the office on Mondays and Wednesdays may be a more useful insight than the fact that he carries his brief case whenever he comes into the office. Some pattern equilibria enable agents to coordinate their activities more effectively than others. To repeat, no form of pattern coordination will permit exact coordination of activities because there will always be unique features of events and actions. Our criterion of evaluation must, therefore, relate to the degree of coordination consistent with endogenous change within the system.

With respect to the second case, the criterion is essentially the same. Suppose that the system is exogenously shocked, so that the pattern or typical features of agents' behavior change. In the movement from one pattern equilibrium to another, some attempts at coordination will be frustrated. The actions of A may be predicated on the no-longer typical features of B's behavior (and vice versa). Nonetheless, we can still assess the performance of an economic system on the basis of its adjustment to change. Here the criterion is the relative amount of coordination consistent with the system's exogenous change.

More concretely, we can attempt to base our judgments of

various policies on the likelihood that a given change will result in a randomly chosen individual's fulfilling his plans [Hayek, 1968, pp. 183-84]. This criterion has two interrelated features. First, some social systems or policies adopt to changes with greater or lesser plan frustration. Second, other systems completely or partially block adaptation to change, thus also resulting in plan frustration.

We illustrate our point by referring again to the example of rent control. First, we argue for plan coordination as the preferable equilibrium concept. Second, we explain why a market process approach requires adopting the concept of pattern rather than that of exact coordination.

The economically crucial effect of setting rents below market levels is surely not that they create a market excess demand for housing. The crucial and more general effect of these controls involves their effect on plan coordination and market signalling of relative scarcity values. If a public housing authority were created to supply the requisite housing units, then any excess demand would be temporary. Yet frustration and discoordination of plans would persist. We will show this, first, by considering the standard case of no public housing, and, then, by considering the case in which excess demand is supplied governmentally.

After controls are imposed, housing services will be temporarily in excess demand. Lessors and lessees cannot make their plans mesh. Over time, however, the housing stock will deteriorate until housing services supplied satisfy demand at

the controlled rental prices. Even with market excess demand eliminated, plans continue to be frustrated, however, for renters cannot bid higher prices for the higher quality units that they prefer.

Now we consider the case in which a public housing authority supplies the unsatisfied demand at controlled prices. Market excess demand is eliminated in the long run, and plans are apparently fulfilled. In reality, however, plan frustration (but no excess demand) appears in other sectors and under other guises. Taxpayers must shoulder part of the housing cost of entitlement-holding tenants. Net taxpayers (i.e., those paying more in taxes than the value of subsidized housing received) must now curtail their planned consumption of other goods. Moreover, satisfaction of renters' preferences will be more apparent than real. Renters will be satisfied with their existing housing stock only because they are unable to implement other plans, such as moving to more desirable areas. Entrepreneurs wishing to respond to price signals in nonhousing markets (e.g., in manufacturing), and workers wishing to take advantage of higher wages will be frustrated in their attempts to move to more desirable cities or regions by the inflexibility of the housing market.¹⁵ Eventually these planned moves will be cancelled and the best made of the current location. There is frustration and lack of coordination, but the market excess demand is eliminated. The state housing authority will perceive that it has "solved" the problem. Instead, it has added to the discoordination of plans.¹⁶ This can be

seen by considering why a region would be attractive to firms and workers.

Consumers preferences would be better satisfied by immigration into the hypothetically more desirable region. Without this immigration, wants that could be satisfied will go unfulfilled. Plans cannot be executed. The mechanism that would normally facilitate adaptations, rising rental prices in growing regions, is rendered inoperative by the controls. There is probably no government with sufficient command over resources to supply excess housing demand of a mobile population (the source of inflexibility in the housing stock alluded to above). Even were public housing authorities to be able to draw on the necessary funds, no effective system of signalling and incentives exists to inform managers of the relative importance of different housing demands. The very reason for the housing authority, the rent controls, has eliminated market-generated signals (i.e., price charges).¹⁷

Thus far we have been arguing the case for adopting plan coordination as the equilibrium concept. We now will explain the reasons for adopting a process approach and pattern coordination concept. The rent control case is vastly more complex than even we have made it thus far. Textbook analysis is misleading in a number of respects. For example, the New York City housing market has not yet fully adapted to a system of rent controls first put in place during World War Two. This situation certainly does not stem from the housing stock's failure to deteriorate sufficiently! Rather,

controls generate a process of response, where each stage generates changes in the environment that cause further responses. In turn, market participants' responses produce further political responses. Public choice theorists would (correctly) assure us that the political changes are endogenous to the system. Let us consider first one aspect of what we are discussing.

Each control breeds evasions of the control. Each evasion produces further changes in the market environment and additional adaptations. In the political arena, those evasions produce demands for new controls, some of which are supplied. There is literally no end to this process so long as there are calculating entrepreneurs, economic and political, who can profit from existing opportunities. There simply is no static equilibrium to which anything will settle down. The rent control case is a prime example of how a process may cease or stabilize. If we were to predict the future course of events in the New York City housing market, we could only predict possible patterns. The only sure prediction is that the patterns will be upset endogenously.

For any applied problem, theorists can and do cut off the analysis at a point at which they have reduced the unexplained phenomena to second-order effects. It is misleading, however, to suggest that they have identified an equilibrium, in the sense of a state of rest. They have just delimited an analytically convenient place to end one chapter of a story. What is a second order effect often becomes a first order problem subsequently. For instance, no analysis of the

economics of converting rental units to cooperative apartments (a legal form that is economically similar to condominium ownership) would be complete if it did not relate the process to the long standing system of rent controls in New York City. Yet such conversions belonged to the category of second order effects until comparatively recently.

Our process view is fully consonant with cutting off analysis in accord with the problem at hand (writing "chapters" of analysis). By not employing an exact or deterministic equilibrium concept, however, we enhance the chance that related and dependent events will be seen as such, rather than as the product of unrelated exogenous shocks (such as cooperative apartment conversion and rent controls). This is one major advantage, as we see it, of abandoning the search for determinateness at the conceptual rather than at the application stage.

We agree that a fruitful equilibrium concept is necessary for developing a systematic analysis. As we saw in the last chapter, equilibrium analysis is a type of causal reasoning. But causal reasoning about process in time differs from static analysis. The equilibrium concept must change accordingly. Maximal possible plan coordination is the most straight-forward adaptation of the plan coordination concept of dynamic problems. Like any other normative economic criterion, this one leaves some issues unresolved. For instance, one could increase the likelihood that some plans would be fulfilled by decreasing the likelihood that others will be fulfilled. Also, one would presumably wish to

minimize the chance that some plans, such as those of the would-be murderer, would be implemented. This is to recognize that the basic questions of right and wrong, of the justice of entitlements, and of the role of the private and the governmental sectors must be resolved before economic reasoning can be used in policy analysis. If this fact is made more obvious by adopting the criterion of maximal plan coordination, so much the better for it.

Our claim here is that a well thought out economic analysis can contribute to public policy discussions. As in rent control example, economic analysis may serve largely to clarify fact patterns for policymakers. Indeed, the rent control case is a paradigmatic example of Arrow's observation [1968, p. 376] that "the notion that through the workings of an entire system effects may be very different from, and even opposed to, intentions is surely the most important intellectual contribution that economic thought has made to the general understanding of social processes." More than any other modern school, the Austrians have consistently applied this insight to social processes. One's attention is drawn to the unintended effects of human actions by systematically analyzing these as part of a process in time. Economic models in which agents foresee all events (at least in a probabilistic sense) render unintelligible any concept of unintended consequences of human action.¹⁸ Insofar as models postulate perfect foresight, they obscure "the most important contribution" of the economic way of thinking.

We have argued that neoclassical economic theory miscon-

ceives problems when it abstracts from the passage of real time. This tendency has been particularly harmful to understanding competition. In the next section, we develop our point further. There we focus on the technique of assuming agents engage in continuous utility maximization. We suggest that agents cannot do this in a world of uncertainty and changing knowledge. Not only is the requisite knowledge for continuous utility maximization absent, but the techniques and institutions people actually use to cope with uncertainty are seriously misunderstood if continuous utility maximization is assumed. We argue that agents follow rules and use institutions as a substitute for continuously choosing at the margin. These rules and institutions are not themselves entirely the product of rational choice. We then relate our argument to some recent work on the theory of the firm.

Rules vs. Continuous MaximizationKnowledge and Rules

Neoclassical attempts to explain rules in the widest sense, including customs, law and other institutionally embodied complexes of rules, are marred by consistent misdiagnosis. A single error characterizes much recent work on such varied topics as the theory of the firm, the efficiency of legal rules, and rules versus authority in monetary policy. In no other area does a subjectivist process approach yield such different conclusions from orthodox models, nor shed so much light on an important topic.

Any model that explains rules in terms of maximizing behavior fundamentally misconstrues the phenomena. Men follow a rule when they respond in a similar way to perceptions of a recurrent pattern. They thereby exhibit regularity of behavior in typical situations. Rule-following behavior is the product, however, not of knowledge or omniscience but of ignorance. This is certainly true for the large class of social rules examined here, which are the product of a process of evolution rather than maximization.

Superficially it might appear that continuous utility-maximization would also result in a pattern of decisions similar to rule-following behavior. The opposite is, however, the case. What makes an event "typical" is that it shares certain abstract properties with other events of this type. Nonetheless, events of a type or class differ in details, often significantly. If, in fact, individuals were

to know enough to discriminate among events of a class, then they would not follow rules or adopt consistent decision patterns in dealing with these events. Rule-following agents decide on the basis of the abstract properties of members of a class. When an agent knows enough about the details or particulars of a case, and of the differential effects of alternative decisions, then he decides not according to rules but on a "case-by-case" basis (or on "the merits of the case"). Case-by-case decisions involve treating similar cases differently, while rule-guided decisions involve treating similar cases identically.

The "rule of law" is perhaps the best illustration of our point.¹⁹ Stated simply, the rule requires judicial decisionmakers to treat cases of the same class the same way [Leoni, 1961, pp. 59-76]. In adhering to a concept of the rule of law, judges are under no delusion the cases they decide do not in fact differ in detail. Nor would most legal commentators deny that, in some sense, these may be a net social gain from occasionally relaxing a rule in some cases. The practical problem is the following. While we know hypothetically that there are probably cases in which, for instance, it would be better not to punish the guilty, we can never know concretely which cases conform to this hypothetical situation. What jurists and legal commentators have discovered is that in the preponderance of cases justice is served by an unswerving application of relevant rules. And similarly for rules generally.

Rules evolve and are adopted because they work, whether these be rules of justice or of procedure within a firm. In the case of evolved rules of conduct or behavior, people obeying the rule often do not know why they work. In many cases, they may not even be aware that they are following a rule. Rule-following behavior precedes knowledge of this behavior, much more so understanding and being able to articulate or rationale the rule.

To be able to articulate why rules work presupposes more knowledge about the processes governed by rules than their users often can or do have. Justice is much more difficult to articulate than it is to practice. Were individuals to know enough to rationalize a rule, they would generally know enough to abandon it. To anticipate a point in the chapter on money, if we had a scientific explanation (theory) of what a successful monetary rule accomplishes we could in principle dispense with the rule.

The aforementioned character of rules derives from their being evolved. Without doing violence to the phenomenon, we cannot conceive of evolved rules and institutions as the product of a maximization process. We reject maximization models here for two interrelated reasons. First, agents arrive at patterns of action through a trial-and-error process. Successful procedures are adopted and unsuccessful ones are rejected. More precisely, those agents who do not adopt successful rules cannot adapt to the relevant environment. In a market situation, this would mean losses and

eventual forced withdrawal from the unsuccessful activity. Individuals stumble upon rules unconsciously, and, to repeat, often unaware that they have done so. Rules not only involve tacit knowledge, but their adoption is also often tacit. Maximization models cannot incorporate this insight. Hayek [1973, p. 18] stated the issue concisely:

Man acted before he thought and did not understand before he acted. What we call understanding is in the last resort simply his capacity to respond to his environment with a pattern of actions that help him to persist. Such is the modicum of truth in behaviorism and pragmatism, doctrines which, however, have so crudely oversimplified the determining relationships as to become more obstacles than helps to their appreciation.²⁰

Our second reason for rejecting maximizing models as applicable to evolved rules concerns the optimality of these rules. The outcomes of evolutionary processes will not generally be optimal in any nontrivial sense of the term. There is no "rule set" from which we draw. Evolved rules are not the product of choices over known alternative rules. Rule-governed behavior is the unintended outcome of trial-and-error procedures. As in biological evolution, starting along one evolutionary path closes off options. In a trial-and-error procedure, knowledge of alternatives is gained only as they are tried. The "choosing" of a rule is consequently done without knowledge of alternative rules. Indeed, adopting one rule diminishes the likelihood that the adopter will learn about the alternatives. To adopt a rule is to regularize behavior and to abandon further trial-and-error activities.²¹ "Workable" not "optimal" is the appropriate

appropriate modifier for evolved rules.²²

If our analysis is correct, then the question of the "efficiency" of economic, political and legal rules must be reconsidered.²³ Such rules represent the framework within which rational or maximizing behavior takes place. The adoption of such frameworks is not itself always the product of a maximizing procedure. It is then not so much an error as a misnomer to talk of the "efficiency" of political, legal and market rules and rule-based institutions. Given these rules, we may analyze the efficiency of choices. But the rules themselves are adopted, at least in part, by an a-rational process. To suppose that, for instance, the legal framework is the product of rational choice only pushes back the question of the framework within which that choice was made. One would eventually be led into an infinite regress. An evolutionary approach avoids this problem.

"Economic imperialism" is widely interpreted as measuring the application of continuous utility maximization models to all human problems. If carried through, this approach will yield not knowledge but the pretence of knowledge. By claiming more for the theory of maximizing behavior than it can deliver, economists will only put their theory into disrepute in those situations for which it is well-suited. To put the point in nonevolutionary terms, we are only asking that economists take their own protestations seriously. Economics analyzes marginal adjustments. We surely can explain the effects on institutions at the margin of changes in constraints. This, however, is not sufficient to generate a theory of institutions.

The Theory of the Firm

Given the attention within the Austrian tradition to competition and to economic process generally, observers are often surprised to learn that there is no recognizable Austrian theory of the firm. In this subsection, we will explain briefly why this is so and offer elements of an Austrian-subjectivist approach to firms and firm behavior. But first a distinction must be made.

The theory of the firm encompasses both the question of why firms exist and how they behave given that they exist. With respect to the first question, the problem as first stated by Coase [1939, p. 332] still (more than ever) characterizes orthodox economic theory:

An economist thinks of the economic system as being co-ordinated by the price mechanism and society becomes not an organisation but an organism. The economic system "works itself." This does not mean that there is no planning by individuals. These exercise foresight and choose between alternatives. This is necessarily so if there is to be order in the system. But this theory assumes that the direction of resources is dependent directly on the price mechanism. Indeed, it is often considered to be an objection to economic planning that it merely tries to do what is already done by the price mechanism.

The existence of firms represents a paradox for formal economic theory because it represents "nonprice planning." This paradox derives from the exclusive reliance of the theory on prices to allocate resources, a reliance we criticized above. In Coase's classic analysis, individuals compare the costs of using the price system to the costs of nonprice planning.

Firms represent nonprice-market institutions within which decisions are made and resources allocated. On the market, there is an optimum amount of this nonprice planning [Coase, 1937, 335n.] The limit to vertical integration is set by the calculational chaos that may infect nonprice planning. If, for instance, the market for an input were to disappear entirely through vertical integration, then all firms using the input would be caught in an economic calculation problem. There would be no market to yield transfer prices within the firm. The firms could no longer calculate profits and losses in this line of activity [Rothbard, 1962, II: 554-60].

Austrians have long found Coase's approach to the existence of firms congenial. It incorporates the essential conclusion of the economic calculation debate. That is, calculation of profits and losses is impossible without competitive markets for inputs. Gains from hierarchial organizations can be captured only so long as they do not completely eliminate factor markets. Coase's is an excellent conceptualization of that problem.²⁴

The Coasean solution does not, however, address the question of firm behavior. This question is usually dealt with in production theory. The structure of this theory is well-known. Austrians are not comfortable with parts of this theory, but they have not really offered a substitute. That they have not is a bit scandalous, even if partially understandable. In any case, we believe that Richard Nelson and Sidney Winter have made a promising beginning in developing a process theory of the firm [Nelson and Winter, 1982]. In

effect, they apply a Hayekian theory of rules and evolved market institutions to firm behavior.²⁵ We feel that this approach ought to be taken up by Austrians.

Nelson and Winter view firms as generated by an evolutionary process. Existing firms can be best explained by reference to prior adaptations to the environment. This adaptation is revealed as rule-following behavior, or "routines" in their terminology. Routines characterizing firm behavior correspond to genes in biology. A firm's routine largely but not completely determines its behavior, as well as its ability to cope with environmental change. Thus firms adapt to the environment in different ways. The way in which they adapt may determine their survival characteristics for future environmental changes. If a firm's routine is inappropriate to a changing environment, and the firm does not hit on a new routine quickly enough, it will be "selected out" i.e., suffer losses and disappear.²⁶

We read Nelson and Winter as avoiding the pitfall of taking the evolutionary analogy too literally. Entrepreneurs can consciously alter their firms' routine, as can human and some nonhuman species. There is also a Lemarkian element in their story: acquired characteristics are inheritable.

Nelson and Winter's approach offers the following three major advantages over the neoclassical theory of firm behavior. First and most important, it avoids imposing a static equilibrium assumption on this important area of economics. The static equilibrium assumption is paralyzing

whenever one wishes to discuss the growth and development of firms and the allied topics of invention and innovation [Rosenberg, 1975]. Nelson and Winter present an impressive indictment of the conventional microeconomic theory of technical change and innovation. Conventional analysis implies outcomes inconsistent with the basic features of such change. To the degree that they explain innovation and change, which are disequilibrium phenomena, neoclassical theorists do so inconsistently and with violence to their own assumptions [Nelson and Winter, 1982, pp. 24-337]. All this is no accident. What is most important about firms in modern western economies is their role in the process of innovation and economic change. Fascination with the equilibrium of a firm inhibits understanding of development and historical evolution. The most important lesson of the biological analogy is its implication that evolved organisms are never in equilibrium, but always in the process of adapting to a changing environment. In this regard, economists' conception of science is anachronistic. Their model of science is nineteenth century physics, a celestial mechanics. Modern science emphasizes the absence of equilibrium in physical processes [Nelson and Winter, 1982, p. 10]. Perhaps a similar shift of emphasis will bring economics into the twentieth century.

Nelson and Winter do not believe routines are just outcomes of conscious choice. We interpret their point as follows. They certainly do not deny that agents are capable of making some rational choices and maximizing over well-defined choice-sets. They merely argue that the subset of

behavior (routines) is inexplicable in terms of standard models, though explicable in terms of evolutionary models. Nor do they appear to fall into the trap that ensnares many critics of maximizing models. These critics object to the specification of the objective function, and suggest that something else is really being maximized (e.g., sales instead of profits). This kind of point not only leaves the structure of the standard theory in place, it is also grist for neoclassical millers, who point out that if we properly account for all variables then it really is profits or utility that is being maximized.²⁷ For Nelson and Winter, nothing is being maximized in the process of a firm's developing a routine. A homely example illustrates their point and the general question of evolved rules and institutions.

In the nineteenth century, thousands of people set out for the Oregon Territory. At first, every group was composed of trailblazers. Each member of the group demonstrably had a purpose: to get to the Oregon Territory. Presumably the behavior of these settlers was optimal. As cohort followed cohort, however, they also did something that was no part of their intention. They trampled out a path that is visible to this day: the Oregon Trail. In Hayek's terminology, this trail was the product of human action but not of human design. Agents choose rationally, but not with respect to this by-product of their choice. In principle, the unintended consequences of even the most rational behavior cannot be anticipated, much less chosen.

Like owners of firms, these travellers were trying to

come to grips with their environment. In so doing, they also created a trail for others to follow. In the case of the trail, of course, it was primarily those who followed the trailblazers who benefited. In Nelson and Winter's case, the firms themselves benefit from the unintended consequences of their own actions (i.e. developing a routine). The principle involved is, however, the same.

The denial of any unintended consequences of human action negates the whole purpose of economics, and eliminates its major contribution to social thought. Nelson and Winter are merely applying this most basic of economic insights to a new problem, the theory of the firm.

The second advantage of their approach is that integrating the theory of the firm into a theory of economic process is made easier and more straightforward. Any evolutionary theory is a process theory. No longer must theorists grapple with the classic deficiency of general equilibrium theory. By their assumptions, general equilibrium models can at most demonstrate a tendency to equilibrium. Once the system settles down into equilibrium, no change can be explained in terms of the model itself. All change must be exogenous. By design, the theorist must leave part of the economy unexplained, if he is to explain the effects of change at all. Candidates for exclusion have included the government, the banking system, war, etc. Yet as theorists strive to include more and more under the subject matter of economics, they paradoxically can explain less and less. They explain less as they eliminate more and more sources of innovation and invention. Today,

economic theory is on the verge of adopting a universal Panglossian view. The system has equilibrated, and all that has happened is optimal. We live in the best of all possible worlds.

An evolutionary model of the firm does not postulate any static or steady state equilibrium toward which firms are moving. Evolution may lead to extinction but never to equilibrium.

The third advantage of Nelson and Winter's approach is the ease which the entrepreneur is integrated into the analysis. Indeed, the entrepreneur is absolutely indispensable to their story. He is a force for change, but is not the product of ad hoc reasoning. He disturbs firms' routines by changing the environment. In turn, conscious entrepreneurial adaptation to a changing environment is sometimes the only way a firm, locked into a now inappropriate routine, may survive. Entrepreneurial innovation may result eventually in a new routine, an adaptation to the new environment. But the focus and the heart of their analysis concerns innovation, invention, and the upsetting of firm routines.

Their starting point is Schumpeter, but they recognize quite correctly that Austrian theorists of entrepreneurship, like Kirzner (and Mises), are kindred spirits [Nelson and Winter, 1982, p. 41]. There are differences between Schumpeterian and Austrian conceptions of entrepreneurship. For one, Schumpeterian entrepreneurs are sources of exogenous shocks, while Austrian entrepreneurs are sources of endogenous adaptation. This and other differences often involve

matters of emphasis. An evolutionary theory of the firm can surely incorporate the common elements from each view.

In the next chapter, we will provide additional elements of an evolutionary theory of the firm. We will also consider a number of policy issues involving competition and monopoly. One additional theoretical issue requires clarification, however, before we get to the more applied topics.

Dynamic vs. Stochastic Equilibrium

In modelling learning, change, error, and expectations, theorists increasingly employ the concept of a stochastic equilibrium. In such models, there is an underlying stochastic process generating the data. Expectations of rational agents will tend to conform to this process. The mean of their subjective estimates will tend to the mathematically expected value. "Learning" involves updating of priors until the subjective probability distribution conforms to this objective probability distribution. Apparent error in forecasts is optimal. Since information is costly to acquire, it does not pay agents to acquire more information about the underlying stochastic process. There is variance in the outcomes, but experienced errors in forecasts will not lead agents to revise their optimal forecasts or alter their behavior.

Some of our misgivings with this approach were stated above in reference to Hahn's "learning functions." In the dynamic or process equilibrium that we have articulated, there is genuine learning. The competitive market process is a never-ending learning process. In an explicitly evolutionary theory this learning is captured in the process of adaptation and innovation. There is no learning in a stationary stochastic equilibrium [Hahn, 1973, pp. 18-20; Littlechild, 1977, pp. 6-8].

Similarly, "imperfections" in the market process do not arise from participants choosing an "optimal level" of

error. The errors on which we are focusing arise from the very attempt to arrive at individual adjustment to the environment. These market errors or imperfections take the form of "too much" product heterogeneity, as firms try to discover and satisfy consumer tastes. The errors may also show up as incorrect expectations of inflation rates or mal-invested capital (chapter 9). In our theory, agents will not be satisfied with outcomes, will revise expectations, and will alter their behavior in the face of error. Error is part of the very market process itself, part of the stimulus to further adjustments. In general equilibrium models, none of this should occur. At the descriptive level, we think our framework provides a better understanding of a wide range of phenomena, from the behavior of firms on competitive markets to agents' desperate attempts to cope with "ragged inflation". At the normative level, our approach and that of neoclassical economics frequently generate diametrically opposed policy prescriptions. We examine some of these in the next chapter.

We conclude this chapter on the following point. The neoclassical models to which we are referring postulate an underlying objective stochastic process. This assumption is very helpful if one is studying Brownian motion, the decay of radioactive particles, and, to a lesser extent, the weather. A social science surely must also take account of how physical processes affect human decisions. But there is no given, underlying process to which we must conform. The process itself is largely the product of human beings'

tastes, aspirations, and expectations. They help make this "objective" process whatever it is. It is not something entirely apart from human beings, but is partly of their creation. In forming expectations, we are not guessing about the collision of heavenly bodies. We are forming expectations about other individuals forming expectations about us, and so forth, as in the classic Keynesian beauty contest example. Every shift in our expectations changes their expectations, thereby changing the data. There may be no value to which our expectations "ought to" conform. Sometimes there will be such an "objective" value as in the cycle of weather and crop failures. At other times, there may not be, as in certain aspects of inflationary expectations (chapter 9).

As in a number of other areas, we are not claiming that there are no applications of stochastic equilibrium in economics. Our objection is to the implied assumption that it is the one, uniquely correct way of understanding informational issues, even if the approach does violence to the phenomena itself. For instance, in their effort to explain learning, neoclassical economists are one step short of "proving" that there is no error in the world. Before falling with them into this abyss, we may want to step back and consider the alternatives.

Notes

¹Almost all theorists use nonempirical criteria in making judgments about the relevance of phenomena. This is true even if their professed methodology runs counter to the procedure. See, for instance, Friedman and Schwartz [1963, pp. 213-15].

²Hayek suggested that the perfect knowledge assumption is really a corollary of the assumption of large numbers of buyers and sellers of a homogeneous goods in an unchanging environment. These latter conditions would tend to produce a situation of complete knowledge of relevant facts. Thus the assumption of static conditions is ultimately the more controversial and important proposition. Hayek [1946, pp. 97-98].

³"Man wants liberty to become the man he wants to become. He does so precisely because he does not know what man he will want to become in time. Let us remove once and for all the instrumental defense of liberty, the only one that can possibly be derived directly from orthodox economic analysis. Man does not want liberty in order to maximize his utility, or that of the society of which he is a part. He wants liberty to become the man he wants to become." Buchanan [1978, p. 112].

⁴Hayek did not envision the need for large scale statistical research in this area. He apparently treated the facts on which economic theory turns to be directly observable and self-evident. Hayek [1937, p. 55].

⁵Kirzner [1973 and 1979] emphasizes entrepreneurial discovery of existing opportunities, as in arbitrage. Shackle [1978] emphasizes entrepreneurial creativity; entrepreneurial actions themselves make the profit opportunities.

⁶Lucas [1975] is one conspicuous exception.

⁷Hurwicz [1973] provides a useful bibliography up to the early seventies. Recent work includes Grossman [1976 and 1977] and Grossman and Stiglitz [1976], which also contain partial bibliographies. See also O'Driscoll [1981].

⁸Hayek [1945, pp. 90-91]. This Hayekian distinction between types of knowledge apparently eluded Lawrence Boland completely. This may partly explain the muddle he made of Hayek's position in Boland [1978].

⁹The importance of contractual and nonprice constraints in competitive markets arose in Chicago Board of Trade v. United States, 246 U.S. 231 (1918). Apparently the court could not understand that price-restraints could, at least in principle, foster competition. We would have to examine this case more carefully to make a definitive judgment. But it does seem to represent an example of our point here. See the interesting discussion in Bork [1978, pp. 41-47].

¹⁰Menger [1963, p.146] perceived the basic question of all social sciences as: "...How can it be that institutions which serve the common welfare and are extremely significant for its development can come into being without a common will directed toward establishing them?" Marx's conception of social science was, of course, similar to Menger's.

¹¹"The formation of prices must precede the process of exchange and not be the result of it." Nicholas Kaldor [1934, p. 127].

¹²We submit that Hahn is logically in error in this argument. Arrow and Debreu have given us sufficient conditions for the attainment of competitive equilibrium. Hahn's argument would be strictly correct only if the Arrow-Debreu conditions were necessary (see the discussion in chapter five).

¹³Two examples come to mind. Milk-price supports (and agricultural price supports generally) have not solved or alleviated farm problems, but have perpetuated and even exacerbated them. Current problems of U.S. steel producers have a history going back to nineteenth century protective tariffs. Each round of protection creates more dependency on existing and future protection.

¹⁴For brevity, we speak of "plan coordination." The reader should recall, however, that in a world of change plans are made only with respect to perceived patterns of others' behavior. There is never exact or precise plan coordination, due to unique events.

¹⁵The source of this inflexibility is explained below.

¹⁶One could recast our analysis in terms of "notional" excess demands. We have no desire to quibble over words. Our substantive point would remain: even when there is no effective excess demand, plans may be frustrated. This point is recognized in macroeconomics. See Clower [1965].

¹⁷A more complete property rights analysis could demonstrate that managers of the housing authority not be less likely to respond to market signals as would entrepreneurs who could appropriate the profits of correct decisions.

Our case is not entirely hypothetical. We understand that the extensive and longstanding system of rent controls has inhibited regional growth and mobility in Great Britain.

¹⁸We will discuss this issue in more detail in dealing with rational expectations, below (chapter on money).

¹⁹In the next subsection, we will apply our analysis of rules to the firm. In the chapter on money, we use the analysis to reinterpret the rules vs. discretion debate.

20Friedman has argued that "natural selection" explanations and continuous utility-maximization explanations are complements rather than substitutes. Thus successful firms are selected by the market. But as theorists we can suppose that it is "as if" firms are conscious profit maximizers. Friedman [1953]. Langlois effectively refutes Friedman's position. He argues that it is dubious methodologically, and, building on Winter's work, he points out profit maximizers who are best adapted to an equilibrium state may be selected out during the equilibration process. Survivors might then not be the true "optimizers". Langlois [1982, pp. 19-22].

21Our anthropomorphic language presents a barrier in discussing evolutionary processes. In speaking of "adopting" a rule, we do not wish to imply conscious choice by the adopter. Quite the contrary.

22We would sharply distinguish our position from that of sociologists, who are quick to perceive optimality in involved structures and rules. Our reasoning here follows Hayek's critique of sociology, at least in part. See Hayek [].

23Such a reconsideration was started in a special volume of The Journal of Legal Studies to which both of us contributed [March 1980].

24None of what we have said here is intended as an implicit criticism of Alchian and Demsetz's study of the firm, which we view as a theory of one aspect of the firm. This aspect is not of particular concern to us here. Alchian and Demsetz [1972].

25Their explicit debt is to Schumpeter, but to exactly these parts of the Schumpeterian system that have the most in common with the Austrian.

26A distinction between the maximizing and evolutionary approaches can be illustrated in this case. If there is a "correct" adaptation to the new environment, rationality and profit-maximization are invoked to ensure that the firm will survive. The evolutionary approach supposes no such thing. For instance, a firm may not survive environmental change even were it true that an infinitely long search would insure its survival and even prosperity. The evolutionary approach thus implicitly incorporates the passage of real time, which in this case incorporates cash and other relevant-constraints. Trial-and-error discovery takes time, and firms may run out of resources before they discover a profitable response to change. Optimization models do not incorporate real time. Thus constraints, such as liquidity constraints, which operate in real time, are ignored.

²⁷Leibenstein has pointed out that theorists such as Scitovsky, Baumol, Marris, and Williamson want to change the objective function but not the postulate of continuous utility-maximization. Leibenstein [1979, pp. 478-81]. On the other hand, Stigler had already argued that Leibenstein merely overlooked one of the elements of a complex utility-function. Stigler [1976]. Though Leibenstein clearly intended to analyze problems in which the continuous utility-maximization assumption is inappropriate, his formulation of the problem left him open to the Stiglerian critique. See Kirzner [1979b, pp.145-46].