Market-Process Theory and "Dynamic" Theories of the Market*

SANFORD IKEDA
California State University
Hayward, California

I. Introduction

Few constructs in neoclassical economics are as elegant and closely bound as the theories of perfect competition and pure monopoly. These theories represent indispensable items in the basic analytical toolbox of the modern neoclassical economist. Their formal derivation relies on the twin propositions that (a) individual agents are "rational" in the sense that they continuously maximize expected utility (or profits) given knowledge of objective function and constraints and (b) the equilibrium that results when agents (in isolation and in the aggregate) behave rationally describes the universe of relevant discourse. Economists engaged in the application of microeconomic theory to economic reality have learned, however, that conducting successful research requires the use of theoretical constructs that were not strictly a part of their technical training, and which appear to conflict with one or both of the above propositions. These constructs are largely comprised of the "stories" or "bits of economic intuition" that are thought merely to be heuristic devices to accompany the teaching of formal models. But they constitute in fact a logically distinct verbal (or what Nelson and Winter have termed "appreciative") theory of what behavior looks like outside of equilibrium, where rationality (in the standard neoclassical sense defined above) need not serve as a useful rule for the individual decision-maker or, even less, as a useful approach for the economic theorist.

Antitrust economists, for example, have long realized that few if any markets meet the structural conditions necessary for the optimal allocation of resources, or that exhibit the zero economic-profit result of the model of perfect competition (assuming economic profit can be accurately measured empirically [5, 219–69]). Similarly, they have come to suspect that the conditions for pure monopoly or the various forms of imperfect competition are rarely if ever met in practice.

An economic theorist might respond to this state of affairs in one of two ways. The first is to attempt to expand the concept of rationality and the scope of equilibrium theorizing in order to incorporate, for example, the phenomena of price and output adjustment, product differentiation,

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search, advertising, innovation, and even economic profit into a more sophisticated equilibrium framework.[1] The second is to accept the idea that there are essential aspects of market behavior that defy expression in equilibrium models regardless of their degree of sophistication. The premise of this paper is that economic theory would be better served if economic theorists paid greater attention and regard to this so-called verbal theory.

In order to appreciate fully the fundamental contrast between the orthodox theory of markets —the theory found in most graduate-level textbooks and in the industrial organization literature[2]—and the one examined here, I will place the latter within the context of the more general framework of what is coming to be known as "market-process theory." This will be the task of section II of this paper. In addition to the positive analysis, section II will also call attention to fundamental differences in the perspective of market-process theory from the orthodox view in relation to normative economics. In section III, I briefly outline and then critically examine two approaches to economic theory and industrial-organization economics that appear to have some kinship with market-process theory. These are Franklin M. Fisher's disequilibrium theory and Nelson and Winter's evolutionary theory of economic change. Section IV provides a summary.

II. Entrepreneurship, the Market Process, and Coordination

At the heart of the market-process theory is the entrepreneur. The familiar entrepreneur introduced by Knight [20] is the agent that bears risk. The importance of the entrepreneur in the present framework, however, does not center upon risk-bearing at all. To better understand the entrepreneur's function here, let us first underscore the fundamental difference between the agenda of standard price theory and that of the market-process theory.

Equilibrium versus Process

In standard price theory the primary (though not the sole) object of scientific analysis is to be able to deduce the constellation of prices and quantities consistent with a set of initial conditions—namely, tastes, resource availabilities, and technical possibilities—that are given in an economic model. (In more advanced theory this set may be expanded to encompass such things as changes in state variables or expectations about future states of the world, in which case the expected time paths of, e.g., prices, outputs, and technical change may become relevant.) Hence, attention is focused principally upon the existence, uniqueness, and (to a lesser degree) the stability of these equilibrium values or functions. By contrast, market-process theory, taking as its starting point the decisions of individual agents, is concerned less with the nature of prices and quantities in equi-

1. The prevailing method in the "economics of information and signalling" also exemplifies this approach.

2. See for example, Scherer [31]. Mainstream market theory has in a sense progressed beyond the simple models of intermediate-level microeconomic text books. Economists have been and are continuing to formulate models of subtlety, complexity, and mathematical sophistication. Moreover, approaches such as game theory that use concepts and techniques other than traditional optimization have been developed. But as Nelson and Winter [29] have remarked, the highly formalized models that are taught in graduate schools and elaborated upon in the profession are for the most part merely mathematical versions of the models that economists learn as undergraduates. In that respect, the fundamental disagreements one has with the simple version, at least the ones expressed in this study, carry over and apply equally to the essence of the more "sophisticated" versions—the nature of both are the same. I would add that modern neoclassical theory, including the theory of games, retains the basic ends-means framework that has been the backbone of mainstream theory for the past fifty years, and it is with this more general framework that I and other market-process theorists are in fundamental disagreement.

librium than with the process by which prices and quantities outside of equilibrium tend to adjust to their equilibrium values. Rather than changeless equilibrium, then, "we look to price theory to help us understand how the decisions of individual participants in the market interact to generate the market forces which compel *changes* in prices, in outputs, and in methods of production and the allocation of resources" [15, 6]. In equilibrium there must be complete consistency between individual plans and the underlying economic data.

The concept of equilibrium is incompatible with genuine *change,* apart from the purely probabilistic variety associated with models of search. Equilibrium modeling requires information on the sample space of events, and because events that are unlisted or do not appear in the sample space at all cause truly unanticipated change or "surprises"—because their very existence had been unknown—such changes cannot be modelled. Change that is in some sense anticipated, even probabilistically, is not genuine change from the market-process perspective.[3]

Moreover, change is not inevitable outside of equilibrium. Economic intuition (verbal theory) suggests, however, that conflicting plans and expectations will tend to be discovered and corrected because not to do so would fail to maximize expected utility. Unfortunately, the postulate of utility maximization is of no use in helping us to understand how the underlying data come to be known to the relevant decision makers in the first place. This is so because *utility maximization is not a method of equilibration, but rather is itself merely a feature of equilibrium.* That is, in orthodox theory the postulate of utility maximization by itself is incapable of steering a market outside of equilibrium toward equilibrium (and it was never meant to do so). In order to "maximize" or "optimize" a value or function we need a clear idea of what the objective function and constraints are. A system is outside of equilibrium, however, precisely because knowledge about the objective function, constraints, or both is at least partially lacking, otherwise we could obtain the equilibrium solution simply through computation. Because utility maximization presupposes the availability of knowledge that itself implies the equilibrium solution, it cannot help us outside of equilibrium where some of that knowledge is absent.[4]

In the market-process framework it is the (profit-seeking) entrepreneur that *discovers* the relevant data, the ends and the means of economic action, and makes it possible for the neoclassical utility maximizer then mechanically to pair the best means to achieve the ends discovered. Hence, entrepreneurial discovery is fundamentally responsible for the equilibrating adjustment economists have come to expect.

Entrepreneurial profit-seeking in market-process analysis has the unintended consequence of coordinating inconsistencies among individual plans, both within and across markets and time. In a system-wide context, absent knowledge on the part of actors of how their plans within a catallaxy (i.e., a market order of voluntary exchange) could be better coordinated, failure to coordinate occurs because decision-makers are ignorant of the very possibility of further improvement.[5] (There may be ignorance[6], for example, on the part of sellers of buyers willing to offer

3. For further discussion on the meaning of "surprise" and of "change," see Kirzner [16, 137–53] and O'Driscoll and Rizzo [31, ch. 3 and 4].

4. Alchian's critique [1] of the postulate of profit maximization focuses on the inappropriateness of the concept when lines of action have potential outcomes that are "describable only as distributions and not as unique events." His solution, that of choosing the "optimum" distribution, however, still presupposes perfect knowledge of the distribution of potential outcomes and is to that extent consistent with equilibrium, rather than market-process, theorizing.

5. Genuine ignorance means more than that agents have diffuse or uniform priors. Rather it refers more fundamentally to the inability of agents to specify completely the set of all possible events and *a fortiori* to attach meaningful (e.g., consistent) probabilities to those events. Genuine ignorance is the lack of awareness on the part of the decision-maker that knowledge relevant to his decision even exists. Hence, the familiar models of rational search (e.g., Stigler [33,

higher prices for a commodity, and on the part of buyers of sellers of a commodity willing to sell at lower prices.) There are thus pure arbitrage profits[7] to be won from discovering plan discoordination, for the entrepreneur then has the opportunity to "buy low and to sell high." The lure of pure profit provides the incentive for the entrepreneur to be on the alert and to seek out and exploit discrepancies in value, which (unintentionally) brings individual plans within the catallaxy into better coordination.

The central role of the entrepreneur in the market process illuminates the nature of this process itself. For if the role of entrepreneurship is to discover and eliminate pockets of ignorance in the catallaxy, then it follows that where such pockets have been eliminated there will be no scope for entrepreneurship. Assuming no further changes in the underlying data, the tendency of entrepreneurship to eliminate all pockets of ignorance tends also to bring about its own demise. Since entrepreneurship is central to the market process, we can clearly differentiate the process of entrepreneurial discovery from the state of equilibrium in which all entrepreneurial activities have ceased.

Entrepreneurship in this sense can be thought of simply as *alertness* to pure (arbitrage) profit opportunities. It follows that while it *may* be true that a particular act of arbitrage involves assets that an individual himself owns (e.g., labor or capital) this ownership is not a necessary condition for the exercise of entrepreneurial alertness. That is, we can separate the role of the entrepreneur from that of the resource owner. The entrepreneur, qua entrepreneur, marshals resources from their owners in the pursuit of profit opportunities. If he uses his own resources, he is both entrepreneur and resource owner. We can then say that because the discovery of profit opportunities requires no sacrifice of resources, pure entrepreneurship is completely costless. The actual exploitation of a profit opportunity via exchange, however, does require the expenditure of resources by someone because market exchange presupposes (private) ownership. Hence, from the point of view of market-process theory, non-governmental entry barriers can arise only when there is exclusive control over an essential resource because only this can prevent the exploitation of profit opportunities.

"Competition" in the market process sense takes place exclusively during the time prior to achieving equilibrium. During this interval anyone may be in a position to discover pure profits regardless of his resource endowment, thus any entrepreneur is vulnerable to rivalrous activity from anyone else [15]. If the resources needed actually to exploit these profit opportunities are in principle available to anyone (through purchase or by virtue of endowment) competition cannot be blocked. There is under these circumstances free entry into any activity where a profit opportunity might exist. This leads to a rivalry among the various competitors, who are each vying to

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171–90]) fail to address the problem of genuine ignorance. See also Hey [12], Kirzner [15, 137–53], and O'Driscoll and Rizzo [30].

6. I relate ignorance and uncertainty in the following somewhat heterodox way. Ignorance is a characteristic of the state of our knowledge about the world, or rather our lack of it. Genuine uncertainty, however, characterizes the decision framework that we ourselves create in response to our ignorance. Hence, human action (in von Mises's sense [27]), which entails planning through real time, is subject to uncertainty; while passive behavior simply takes each moment as it comes, indifferent to gaps in knowledge. Thus, only an acting individual forms expectations about the future from within his self-created framework. These expectations, directed toward an unknowable future, are subject to disappointment and frustration. There is some similarity between this and Buchanan and DiPiero's [2] distinction, based on Knight and Shackle, between "structural" and "cognitive" uncertainty.

7. We can think of production through time as a form of intertemporal arbitrage, which occurs when the value of resources in the present (inputs) is less than the value of these resources in the future (output), discounted by the rate of time preference and risk. Thus, both production and speculation can be seen as manifestations of entrepreneurial activity.

be the first to discover and exploit the profit opportunities, which ceases when all profits have been exploited and the system has reached an equilibrium. The essence of competition here is therefore the free entry of rivals, each in a incessant race to better the others.

Optimality versus Coordination[8]

A positive analysis of markets grounded on the concept of the market as a non-equilibrium phenomenon would be at odds with a framework of normative evaluation that took as its principal point of reference a state of equilibrium. Because the essential feature of the competitive process is the acts of entrepreneurial discovery of unnoticed profit opportunities, a normative market-process theory would be concerned, less with the formal conditions necessary to generate a Pareto-optimal equilibrium price-output combination, but more appropriately with those institutional conditions that promote the discovery of profit opportunities.

As we have just seen in the previous section, in a market order in which the intra- and intertemporal plans of individuals in the market completely dovetail with one another, entrepreneurial activity has run its course. Here plans are fully coordinated in the sense that any other configuration of plans would lead to disappointment. Ideally, economists would like to be able to determine the degree to which the actual market order deviates from full plan coordination and what steps would be necessary to approach this more desirable state of affairs. But because this information emerges as the unintended by-product of the entrepreneurial-competitive process itself, observers cannot simply gather it (without becoming entrepreneurs themselves). The problem, then, is that, because the bits of knowledge relevant to any given decision are dispersed among many anonymous actors in the catallaxy and can be discovered only through a process of entrepreneurial profit-seeking, economists lack the relevant knowledge to implement the normative apparatus of orthodox economics.[9] This is one aspect of what Hayek [11, 179–90] has termed this the "knowledge problem." What market-process theory requires, therefore, is not a perfect state of coordination against which to compare actual performance (which is an impossible task), but rather an entirely different perspective . . . one that incorporates the idea of entrepreneurial discovery.

While it is impossible to calculate the final fully-coordinated end state toward which a set of initial conditions would lead (were there no further disturbances in the underlying data and entrepreneurial forces permitted to operate), our understanding of the nature of the entrepreneurial discovery process does enable us to theorize about the institutional framework and market condi-

8. With regard to the overall development of the normative approach based on the coordination criterion, the following works are significant. Hayek [7], where the seed of this concept was planted; see also, Hayek [8, 100, 105] and [9]. Hayek further elaborated on the performance of the competitive process in discovering the "relevant data" in Hayek [11, ch. 12]. Hayek's view of the market process was greatly influenced by Ludwig von Mises, most of whose thoughts on this topic are set out in [27, 212–17, 244–50, 327–33, 698–715, 652]. Israel M. Kirzner has presented what is perhaps the most definitive statement to date on coordination as a normative criterion in Kirzner [15, 212–42] as well as [16, ch. 1,2,8, and 13]. See also Kirzner [17; 18, 25; 19]. Of related interest is O'Driscoll and Rizzo [30, 109–13], and Lavoie [24]. Lachmann [21], who is even more skeptical of the value of equilibrium constructs, offers his own (somewhat idiosyncratic though related) interpretation of market-process analysis in general, along the lines of Hicks and Shackle.

9. In the case of government intervention such as rent control it is indeed possible to use the orthodox end-state criterion not only to conclude that the control makes society worse-off than otherwise, but also assert that *ceteris paribus* a specific measure would result in a Pareto improvement, e.g., removal of the rent control. What I have in mind in the text, however, are features of the market that are not necessarily the result of government intervention. Hence, perfect competition would be an inappropriate benchmark with respect to an industry that had become concentrated through market forces alone, without the aid of government.

tions that best ensures, or least hinders, its attainment. What is important for this type of analysis is the question of how a particular configuration of elements in a market order (e.g., laws of property, contract, customs and conventions) may influence the entrepreneurial-competitive process taking place within it.[10]

For this normative analysis it may be desirable though not absolutely necessary to differentiate among those elements over which there is the possibility of relatively more or less control. For example, laws of contract are relatively more subject to deliberate change than, say, social customs. But even for those institutions that are truly "spontaneous orders" [10, 96–105], and therefore beyond the deliberate control of the human mind, an understanding of the relation between them and the likelihood of entrepreneurial discovery would be helpful in avoiding policies that might ultimately retard such discovery. The product of this kind of understanding may be predictions about the "patterns" of outcomes—statements that exclude particular outcomes or give merely the direction of changes, *ceteris paribus*—resulting from a particular set of rules or institutions rather than precise point predictions [10, 22–42].

To put this whole matter of orthodox versus market-process normative analysis in a different way, consider a world in which adjustment takes place rapidly relative to changes in the underlying economic data. In such a world, it might be proper to apply equilibrium constructs for positive analysis because at any moment measurable empirical magnitudes might well correspond closely to the equilibrium values (consistent with full plan coordination) of their counterparts in an equilibrium model. One can infer from this, however, only that the market solves the "knowledge problem" very quickly, but not that the knowledge problem has ceased to exist. When a change occurs, the agents in this world are initially ignorant of the change and its character. This implies that entrepreneurs have yet to discover and eliminate some ignorance and (unintentionally) correct the resulting plan inconsistencies even if, as I have assumed, adjustment is rapid. Thus, even in a Pareto-optimal world, if our concern were with maintaining efficiency in the face of change, we should still place primary emphasis on ensuring that the adjustment process remains rapid and not on whatever current deviations there might be from the theoretical optimum. The concern should be, that is, on maintaining or improving conditions that facilitate the discovery of mutually beneficial exchange.

III. "Fellow Travellers"

The market-process framework (MPF) does not exist in a vacuum. The reader may at this juncture feel moved to point to several economic theorists who have recently made observations very similar to those made here regarding the limitations of the neoclassical orthodoxy. There also appears to be a great deal of similarity in some of the concrete responses, the positive and normative theory, that have followed their criticisms. It remains for us to discover the extent to which their contributions represent a departure from that orthodoxy with which a growing number of economists have been feeling increasingly uneasy and an approach toward the framework presented here.

Fisher's Disequilibrium Foundations

Beginning in the 1970s, Franklin Fisher's interest in antitrust litigation produced several articles

10. For a view of the "new institutionalism" from several diverse perspectives, see Langlois [23].

and books that bring a fresh perspective to the theory of industrial organization, in particular, and of competitive processes, in general.

Diagnosing Monopoly. It might be helpful in this comparison to begin with Fisher's analysis of market structure. Here one of his main points is that monopoly, which here refers to dominance in a market by a single seller, does not necessarily confer monopoly power [4, 12, 32]. Although this is hardly a new idea, Fisher's analysis concentrates on supply substitutability and entry as the principal competitive constraints on behavior in allegedly monopolistic markets [5, 20, 25]. Moreover, in an industry such as data processing, for example (an area in which Fisher [5] has devoted much research), the significance of market share, alone, pales in comparison to other parameters of competition such as the rapidity of changes in the technical state of the arts, dominance in innovative activity, and the growth rate of demand.

In the process of scrutinizing various attempts to measure the economic rate of return, Fisher addresses the more fundamental issue of the desirability of rewarding innovators with something that looks very much like monopoly profits [5, 219–69]. Here Fisher invokes the Schumpeterian tradeoff between static allocational efficiency versus dynamic innovation. He is Schumpeterian to the extent that he appears to heavily discount the static dead-weight losses of monopoly power against the potential future welfare gains, especially in markets in which changes in both technique and demand occur frequently and unpredictably. Economic profits are seen as necessary to spur and reward innovation. Without profits there would be little competition in any sense other than the passive price-taking behavior found in the perfectly competitive model [5, 19–42]. Moreover, investors must be compensated for their willingness to be subject to a high degree of uncertainty. This is particularly true in a market as volatile as data processing.

Analysis of Stability. It is natural to compare Fisher's interest in dynamic forms of competition with his more recent work on the disequilibrium foundations of equilibrium economics [3] and to imagine that the link between his views on monopoly and so-called "dynamic competition" parallels that of the market-process framework. Fisher does indeed link disequilibrium analysis to dynamic competition, for example, in his criticism of the naive application of the models of perfect competition and pure monopoly to issues of economic policy.

> To a large extent, all these errors stem from a common source, a focus on the long-run equilibrium of the competitive model to the neglect of the process that brings that equilibrium about. Because disequilibrium is transient (and perhaps because of the beauty of the analysis of equilibrium), there is sometimes a tendency to view disequilibrium as necessarily very short-lived. This in turn gives rise to a tendency to analyze real markets as though they were always in long-run equilibrium and, indeed, sometimes to forget the precise nature of the definitions (profits, costs, entry barriers) that make the beautiful equilibrium propositions true [3, 19].

In his disequilibrium analysis Fisher presents a well-developed model of adjustment in which rational economic agents drive the system toward an equilibrium. For present purposes the actual specification of the model is less important than the assumptions that Fisher has identified as being essential for the convergence of theoretical models to equilibrium.

Its major thesis is that neoclassical theorists have neglected to develop a theory of stability to equal the grandeur and sophistication of their theories of general equilibrium. According to Fisher, the stability of and rapid convergence to equilibrium has for the most part merely been assumed [3, 9]. This is partly due to the *non sequitur* that the instability of disequilibrium states implies convergence, and partly to the unfounded belief that disequilibrium analysis refers to a naive *tatonnement* process [3, 1, 3, 9]. Fisher argues that without an adequate theory of equilibration

(or stability), the confidence that economists place on general-equilibrium models—especially in their (positive and normative) analysis of the price system under perfect competition—is without foundation.[11] "The proper conclusion is then either that the foundation must be soundly laid or that the structure based upon it must be drastically altered" [3, 2] (footnote omitted).

Fisher's first response is to attempt to "lay a foundation," rather than drastically alter the equilibrium edifice. On this, however, Fisher appears to keep an open mind, since elsewhere he suggests that, should it turn out that the world is "not close to equilibrium at all . . . the study of disequilibrium if not stability, becomes the main business of economists" [3, 5].[12]

This appeal for greater attention to equilibrating tendencies and stability analysis is not unique. However, while other neoclassical theorists have made similar observations, the clarity with which Fisher has identified the essential problems as well as his positive theoretical program, distinguishes him from the others. Even more significant from the perspective of the MPF are the crucial assumptions that underlie his theory of convergence, and what this implies for equilibrium analysis.

> It may well be true that an economy of rational agents who understand that they are in disequilibrium and act on arbitrage opportunities is driven toward equilibrium, but not if these agents continually perceive new previously unanticipated opportunities for further arbitrage [. . .] What we can hope to prove, therefore, is that in a world with no unforeseen opportunities, stability will occur and equilibrium will be asymptotically achieved. To put it another way, we can hope to show that the continued presence of new unforeseen opportunities is a necessary condition for instability—for continued change [3, 87, 88] (emphasis omitted).

Fisher's view of the problem is inspired by Schumpeter [32], who described economic development in terms of entrepreneurial discoveries that periodically jolt the economy out of its steady-state circular flow.

Three features of the model of convergence are of particular interest, the latter two concerning two possible meanings attached to the term "perception." First, the system can converge only if unforeseen arbitrage opportunities, which Fisher calls "favorable surprises," are assumed not to happen. That is, for convergence to occur there can be no favorable surprises, for if there were, agents attempting to exploit arbitrage opportunities would create constant disruptions in the process of equilibration. Arbitrage does occur, however, but only where profits are not *unexpectedly* high (i.e., there are no favorable surprises) [3, 89]. Second, it is possible that the new opportunities giving rise to favorable surprises are simply *beliefs*. Hence, convergence requires that there be an "absence of a stream of *perceived* new opportunities, real or imagined" [3, 89] (emphasis original). Here, "perceived" means "subjective" and should be contrasted to "objective."

Third, Fisher also appears to intend "perceived" to mean "recognized." He occasionally uses "perceived" in both senses (i.e., "subjective" and "recognized"), as when "an economy with rational agents acting on perceived [recognized] arbitrage opportunities is in fact driven to equilibrium if new opportunities are not continually [subjectively] perceived to arise" [3, 2]. The significance of this second meaning becomes apparent when Fisher states, for example, that in

11. Fisher [3, 9] places much importance on this rationale for the study of stability. Note, however, that Nelson and Winter's argument [29, 355–95] regarding the (at best) neutrality of neoclassical welfare theory (and by implication the model of general competitive equilibrium) with regard to the socialist planning debate, might lead one to re-examine the purpose of Fisher's investigation.

12. Fisher actually takes a safer methodological stance. His prime concern is with the stability of equilibrium *models*. "Put succinctly, the question is not merely whether the economy is stable but whether the models we use are stable" [3, 5].

the model agents are allowed "to realize that they are not in equilibrium" [3, 86]. Permitting disequilibrium awareness means that agents know profit opportunities still exist. Moreover, not only are agents aware of their disequilibrium conditions, the model also provides them with the knowledge that would eliminate the disequilibrium. In the language of the MPF, agents simply exploit already discovered profit opportunities. Disequilibrium awareness is really the flip-side of the assumption of "no favorable surprise," since suppressing new discoveries implies that all profit opportunities relevant for achieving equilibrium must be known.

The Disequilibrium Foundations of the MPF. Many of the observations highlighted here are by no means unique to Fisher. His analysis, however, both in market and stability theory, is consistently oriented toward a view of market activity as a process rather than a state of affairs. Fisher, with impeccable neoclassical credentials, may well serve as an indicator of the possible direction in which he and other neoclassical "fellow travellers" may be pointing the mainstream. Despite so much overlapping, however, several points of difference call for closer examination.

With respect to industrial-organization theory, Fisher strongly emphasizes the crucial role of entry barriers[13] for the existence of monopoly, and upon the competitive character of a producer who has gained a large market share through efficiency rather than barriers. As noted, he appreciates the "necessary role of profits" for innovation, and, after Schumpeter, defines innovation broadly enough to encompass discoveries of new markets and resources, as well as new techniques. However, he tends to follow common practice and concentrates almost exclusively on technical innovation (the discovery of profitable uses for new technical improvements), rather than the equally dynamic discovery of preferences or new resources.

As pointed out in section II, from the perspective of the MPF, control over essential resources is the principal barrier to the competitive process. Interestingly, in the context of technical change, Fisher also appears at least in spirit to be a "resource-monopoly" theorist. "One sees a mousetrap inventor making profits. One sees the mousetrap inventor alone in the field. One ought not, however, to conclude therefore that he has a monopoly of mousetraps. Indeed, what really matters, in some sense, is whether he has a monopoly of technical progress in the industry" [5, 12]. Although featuring "technical-progress monopoly," Fisher's approach in this sense bears a close family resemblance to the market-process theory of input monopoly.

The most profound difference separating Fisher's approach to economic process from that of the MPF is his treatment of the knowledge problem. I earlier indicated that the assumption of no favorable surprise is tantamount to investing complete knowledge of available profit opportu-

13. Fisher acknowledges having been "aided greatly in thinking" about barriers to entry by the work of C.C. von Weizsäcker. According to the latter, a "barrier to entry exists when entry would be socially beneficial but is somehow prevented" [35, 3].

Besides the exclusive control of a scarce resource, Fisher falls back on the familiar notion that "imperfect capital markets" are a barrier to entry. According to Fisher, it could happen that

> credit markets function imperfectly so that the rate of interest which must be paid by a small firm to make the lumpy investment required for entry is higher than that which would be paid by an incumbent firm to make a similar investment and higher in a way which does not simply reflect the greater risks involved. In the limit, it may be that a potential entrant cannot borrow the money at all [4, 26].

To the extent that these imperfections result from genuine ignorance (in the sense of the MPF), however, it would seem odd to refer to them as barriers to entry. That is, if the *sine qua non* of the entrepreneurial-competitive process is the discovery of pockets of ignorance, it would seem absurd to say that ignorance itself is an obstacle to this process. This would be rather like saying that the existence of a mountain is an obstacle to anyone who might wish to climb it. However, in the standard neoclassical framework, in which entrepreneurial discovery plays no role, genuine ignorance may well be an insurmountable obstacle.

nities in the information sets of the economic agents. For Fisher the process of equilibration in the stability theory, then, no matter the merit of its technical achievement, represents simply a playing-out of forces inherent in the system, and involves no genuine discovery whatever. It is the relatively mechanical process of exploiting already discovered profit opportunities. Fisher's model is unquestionably "dynamic" in the sense that it addresses the phenomenon of equilibrating adjustment, but appears to fall short of being dynamic[14] in the sense of viewing competition as a discovery process.

It would be unfair to conclude on this note, however. For Fisher has undoubtedly understood, perhaps more profoundly than any other neoclassical theorist, the disruptive aspect of entrepreneurial discovery. Without ruling out disruptive favorable surprises, Fisher is correct in saying that it would be impossible to guarantee complete equilibration. Where he appears to have fallen short is in not realizing that entrepreneurship has a *coordinative* aspect, as well. Here we face the fundamental distinction between the Schumpeterian versus the Kirznerian view of entrepreneurship [15, 125–31]. To the extent that entrepreneurial-competitive activity involves the discovery of inconsistencies between current plans and the underlying data, entrepreneurship coordinates rather than disrupts the market order.[15]

Also, Fisher's emphasis on the assumption of "no favorable surprise" yields insights about the nature of equilibrium. Perhaps from the point of view of the MPF, Fisher's greatest service has been to spell-out precisely the extremely unrealistic (and potentially misleading) assumptions that are crucial for the *modeling* of the convergence to equilibrium and perhaps also to the likelihood that such convergence *actually* takes place. In so doing, he may have quite possibly (intentionally or unintentionally) demonstrated a fundamental weaknesses and limitation of equilibrium analysis. This interpretation brings Fisher closer to the market-process camp.

The Evolutionary Theory of Nelson and Winter

Nelson and Winter (NW) are outspokenly non-neoclassical in their approach to economic theory (though they have established an impressive record of publication in mainstream journals). Interestingly, there appears to be a great deal of similarity to the MPF in the type of criticisms they level against orthodox neoclassical theory. Moreover, the positive and normative alternatives that they offer seem to be very much in the spirit of market-process theory. They claim, for example, that their theory "is a theory about market processes." In a sense, the market-process theory presented in this essay is also evolutionary, insofar as its principal orientation is toward genuine economic change and unintended developments. One lesson that NW draw from evolutionary theory, well understood by market-process theorists, is that an appreciation of the complexities[16] of historical processes should keep "the ambitions and pretensions of economic theorizing under realistic control; there is reason not to expect too much" [29, 172]. It remains to be seen, however, how far beneath the surface these resemblances extend.

Positive Evolutionary Theory: Schumpeter and Simon. It will ease the task of comparison if I simply comment on the numerous areas of positive theory in which the ideas of Nelson and Winter (NW) overlap or are in substantial harmony with those of the MPF at the time I present them.

14. With all due respect to the memory of the late Fritz Machlup [26].

15. Moreover, it is important to remember that the discussion of stability and convergence toward equilibrium for Fisher remains entirely in the world of modeling [3, 5].

16. I will later indicate how NW's concept of "complexity" might differ from that of the MPF.

I will treat in separate sections the points of contrast between both the positive and normative theories.

NW acknowledge their intellectual debt to Schumpeter and Herbert Simon [29, ix]. For the core ideas of their theory are, first, that competition is a dynamic process rather than a static state of affairs, and, second, that individuals and firms operate in a world too complex and with events too novel to permit rational behavior in the neoclassical sense of continuous optimization. Dynamic competition takes place in a world of bounded (individual and firm) rationality [29, 15, 39].

The following passage from *An Evolutionary Theory of Economic Change* captures the general scope and strikingly market-process flavor of NW's research program.

> The firms in our evolutionary theory will be treated as motivated by profit and engaged in search for ways to improve their profits, but their actions will not be assumed to be profit maximizing over well-defined and exogenously given choice sets. Our theory emphasizes the tendency for the most profitable firms to drive the less profitable ones out of business; however, we do not focus our analysis on hypothetical states of "industry equilibrium," in which all the unprofitable firms no longer are in the industry and the profitable ones are at their desired size. Relatedly, the modeling approach that we employ does not use the familiar maximization calculus to derive equations characterizing the behavior of firms. Rather, our firms are modeled as simply having, at any given time, certain capabilities and decision rules. Over time these capabilities and rules are modified as a result of deliberate problem-solving efforts and random events. And over time, the economic analogue of natural selection operates as the market determines which firms are profitable and which are unprofitable, and tends to winnow out the latter [29, 4].

NW reject what they believe to be the twin pillars of neoclassical theory—maximization of some objective function and the concept of equilibrium. (Later in this section, however, I will show that NW have left relatively undisturbed another pillar of the neoclassical paradigm.)

To understand the basis for NW's rejection of these principles, it is important to realize that they see themselves as rehabilitating the evolutionary tradition of Adam Smith and Alfred Marshall—a tradition interrupted, they say, by the profession's nearly exclusive adoption of the maximization-equilibrium approach after the Second World War.[17] Theorists in the MPF would be sympathetic to this view of the evolution of economic theory.[18]

Having departed from the tradition of evolutionary theory (Marshall's "economic biology"), NW point out that modern economics has had difficulty in addressing questions of economic change.

> This theoretical neglect of competitive *processes* constitutes a sort of logical incompleteness. . . . It is only in equilibrium that the model of optimizing behavior by many individuals really works. Disequilibrium behavior is not fully specified (unless by *ad hoc* assumptions). But this means that there is no well-defined dynamic process of which the "equilibrium" is a stationary point. . . . the question of how equilibrium comes about cannot be posed in fully orthodox theoretical terms (without *ad hoc* assumptions), and thus necessarily cannot be answered [29, 32] (emphasis original).

17. Nelson observes that "while economic man of Smith's theory is purposive and clever, Smith never said he was literally a maximizer," and "while for Smith opportunities drew action, Smithian economics is not about systems in equilibrium in any meaningful sense" [28, 286, 470]. And about Marshall they argue that their evolutionary theory "is closer to the original Marshallian doctrine than is contemporary theory" even though the latter may claim him as a precursor [29, 45].

18. See Kirzner [15, 90]. Nelson [28,460] observes that one reason modern microeconomic theory was purged of serious concern with long-run economic change is that "it proved easier to provide a satisfactory mathematical statement of static theory then [sic] of a dynamic one."

In a static world, agents encounter no problem of novelty and complexity, and the bounds of rationality fail to constrain [30, 91]. But NW suggest that even mainstream economists, when they attempt to analyze historical change, are forced up against the limitations of their formal apparatus built upon the maximization-equilibrium paradigm ("formal" theory) and usually fall back on a verbal ("appreciative") theory firmly rooted in an evolutionary approach [29, 46; 28, 470]. NW's principal aim is to formalize that "appreciative" theory.

Before outlining their theory of innovation, it will be convenient first to describe how NW account for the predictable elements in market behavior. They explain that boundedly rational individuals and firms behave according to decision rules or routines. These routines are the market analog of genes in biology in that they preserve patterns of behavior over time [29, 134–6] and serve as "organizational memory" [29, 99–107]. These routines permit "choice without deliberation" or "programmed choice" [29, 82, 83]. Moreover, NW suggest that in organizations (as well as in individuals) *rules govern other rules* from ever higher levels. There is in other words "a *hierarchy of decision rules* with higher-order procedures . . . which act occasionally to modify lower-order ones. . . . And there may even be procedures of a still higher order, such as occasional deliberations regarding the adequacy of present research and development policy, or of the methodological soundness of the marketing studies being used to guide advertising policy" [29, 17–18] (emphasis added). Here deliberate choice has a "narrowly circumscribed role," and is itself a form of routine behavior [29, 84–5].

Innovation represents a change in routine [29, 128]. As just noted, however, NW characterize the process of innovation itself as a routine. They have chosen to model these routine-changing processes, the highest-level routines, as searches [29, 18]. Viewing innovation as a routine, NW argue, does not imply that the outcome of research is predictable [29, 133], since the set of production technologies is known only *stochastically* and cannot be completely described [29, 155]. That is, what firms are aware of is a "characterization of a population of routine modifications or new routines that can be found by search," but which is not known with certainty [29, 18]. According to NW, such higher-level routine functions can produce "major change" and "radical improvement" [29, 130], and the profits from successful innovation are a "disequilibrium phenomenon" [29, 28].

With respect to "competition," NW discuss two functions of competition depending on how it is defined. "One function of competition, in the structural sense of many firms . . . would be to make possible . . . a diversity of response in order that a range of possible behaviors might be explored" [29, 276]. The more firms there are, the better the chances of at least one of them drawing the best technology. "Another function of competition, in the more active sense, is to reward and enhance the choices that prove good in practice and to suppress the bad ones" [29, 276]. The reward element of competition bears some resemblance to the role of entrepreneurial profit in market-process theory, although it remains to be seen whether they are identical concepts.

Having elaborated on their approach to innovation and competition, NW incorporate these insights into a mathematical model of Schumpeterian competition. Kamien and Schwartz provide the following summary of this model.

> They simulate an industry composed of firms that may either innovate or imitate and follow prespecified rules in choosing from these alternatives and the level of investment. A firms's investment in innovation is proportional to its capital stock. Expansion of its capital stock occurs when the firm realizes profits above a target level. Large firms have a higher target than small firms. A firms's output is proportional to its capital stock and innovation consists of improvement of the productivity of capital. The result of investment in research and development is uncertain

> but the more that is spent, the higher is the probability of coming up with a new technology superior to the present one. The opportunities for finding a superior technology with a given level of expenditure improve through time exogenously. Research and development is financed internally so large firms spend more than small firms. Because large firms have higher target profits, they expand their capital stock less than small firms [14, 221].

In this particular model, the evolutionary process takes place through the selection of firms with the best search behavior rather than through the reform of routines within a given firm, although NW claim that adaptive R & D could easily be incorporated into similar models, which would imply that the probability of drawing a better technology becomes endogenous [29, 287].

Other areas of overlap between NW's positive framework and the MPF's include a clear recognition of the Schumpeterian trade-off between static efficiency and innovation [29, 330].[19] In harmony with the MPF is their observation that large firms or high market-concentration may be necessary for dynamic competition and technical change [29, 38–9]. Finally, like the MPF, NW recognize that orthodox equilibrium analysis "sees monopoly as 'there,' " while neglecting for the most part its evolutionary history, although they themselves spend little time pursuing this theme [29, 366].

Normative Evolutionary Theory: Computation and Control Problems. NW's approach to normative theory, while based on a Schumpeterian notion of economic evolution and Simonian bounded rationality, seems also to draw support from the work of F. A. Hayek. From Hayek they have adopted the idea that information necessary to allocate economic resources efficiently is widely dispersed among many agents in the economy.

NW stress the role of organization rather than resource allocation in guiding economic activity. From their organizational perspective, they are able to discern two analytic aspects of the normative problem. The first is the staggering task facing society simply in sending, receiving, and computing the enormous amount of data required for efficient resource allocation. The second is essentially one of control: once the information has been collected and computed, widely scattered individuals must now receive the information along with instructions, and they must somehow be induced or coerced into acting accordingly [29, 358–9]. The fundamental normative problems for an evolutionary theory, then, are computation and control.

Reasoning from this framework, NW arrive at a conclusion perhaps disturbing to most orthodox theorists. They argue that the widely held belief that the market or "free enterprise" economy is a more desirable institutional environment in which to operate than a centrally planned one cannot rely on the theorems of traditional welfare economics [29, 357–8]. Standard welfare theory can demonstrate only that "a competitive regime . . . will do as well as can be done," which "does *not* hold that competition can outperform central planning or any other organizational alternative . . ." [29, 357] (emphasis original). NW claim that "nothing in those theorems says that planning or regulation cannot be made to work (optimally)" [29, 358]. The orthodoxy's belief in the superiority of relatively free markets stems from its implicit (appreciative) evolutionary theory, best expressed in the writings of Schumpeter and Hayek, which, however, is incompatible with static welfare theory [29, 356, 360]. Orthodox theory assumes given and perfectly known opportunity sets, and when the scope of the opportunity sets is ambiguous—as NW claim is true in evolutionary theory—the notion of maximization becomes indefinite [29, 355]. Hence, "if the

19. On the cost side of the trade-off, NW identify, in addition to the usual dead-weight loss, a loss associated with the gap between the best- and worst-technology users in the market and a loss resulting from duplication of R & D efforts.

economic world is in continuing flux, as our positive theory suggests is the case, the normative properties associated with competitive equilibrium become meaningless, just as that equilibrium is meaningless as a description of behavior" [29, 366].

While advocates of the direction of social resources through central planning see no obstacle in standard welfare theory, the problems of computation and control, which evolutionary theory brings to light, would seem to present serious theoretical obstacles to such a policy.

From this perspective, NW would refocus normative analysis in a manner apparently congenial to the market-process approach:

> The "anatomy of market failure" discussion in neoclassical economics is focused on equilibrium conditions of a stylized market system. We propose that, from an evolutionary perspective, such a discussion should properly focus on problems of dealing with and adjusting to change. The shift in perspective is important. It involves abandonment of the traditional normative goal of trying to define an "optimum" and the institutional structure that will achieve it, and an acceptance of the more modest objectives of identifying problems and possible improvements [29, 366].[20]

Given computation and control problems, we are to evaluate organizational performance based on the speed and accuracy of adjustment [29, 360].

Contrasts: Positive Theory. Evolutionary theory appears then to overlap with the MPF a great deal and I have attempted to draw out areas of apparent agreement and commonality. But there are profound differences, as well. These will serve, however, not only to differentiate market-process theory from NW's evolutionary theory, but also to reveal how some of those points of apparent commonality mask fundamental disagreements. To this end, I will now examine more closely the concepts of bounded rationality, evolutionary "disequilibrium," and competition.

Bounded rationality becomes an issue in evolutionary theory owing to the high degree of complexity that prevails in a world of flux. Because each change brings with it new data to be processed and transmitted, a constant flood of data can overwhelm the individual agent. There is in this view too much information in the world to permit individuals and firms to make the lightning calculations necessary for optimal behavior. Since there are limits to rationality (in the neoclassical sense), economic agents must make do with rules of thumb and routines, which provide some guidance in an environment of bewildering complexity. From the perspective of the MPF, however, the fundamental economic problem is, to put it simply, not that there is too much information in the world, but rather that information relevant for coordinated decision-making is currently unkown.[21] It is the paucity of information available to the relevant decision-makers, rather than its over-abundance, that constitutes the Hayekian "knowledge problem."

Bounded rationality refers to the limited capacity of individuals or firms to process a given amount of data. It does not address the logically prior question of how the data become known to the relevant agents in the first place. In NW's model of competitive innovation, there is given "a characterization of a population of routine modifications or routines that can be found by search" [29, 18]. The problem of bounded rationality presents itself when individuals do not know in advance precisely which of these routines represents the best choice [29, 276].[22] Agents do have

20. By "institutional structure" NW apparently are referring to such things as the number and size distribution of firms and the like, so that the last sentence of the passage above represents no real conflict between their attitude toward outcome-oriented benchmarks, such as Pareto optimality, and the one presented in this study.

21. Undoubtedly rules of thumb exist. The problem is how do we go about choosing the relevant rules of thumb? By using other rules? Where do these come from? The concept of entrepreneurial discovery avoids this regress.

22. NW assert that in evolutionary theory, "choice sets are not given and the consequences of any choice are un-

knowledge, however, of the probability distribution of all possible routines—they simply do not know the consequences of any particular draw.

The concept of bounded rationality depends crucially on complexity.[23] That is, in the absence of complexity, the limits of rationality fail to constrain, and the evolutionary approach collapses into that of standard neoclassical economics.[24] For the MPF, however, complexity owing to incessant change in the underlying data is unnecessary to generate the competitive process. If the fundamental economic problem is one of acquiring the relevant data, there remains scope for entrepreneurial discovery until all the relevant (unchanging) data have been discovered.

In modeling industries, NW "often find it convenient to assume that 'temporary equilibrium' is achieved—to abstract from such short-run dynamic processes as those that establish a single price in the market in a single period" [29, 18]. They abstract, in other words, from the (non-equilibrium) entrepreneurial-competitive process. In this respect, NW's evolutionary approach resembles quite closely a "dynamic equilibrium," in which at each moment a "dynamic" system attains a temporary equilibrium. From the market-process perspective, it is difficult to interpret this as a true disequilibrium.

NW appear also to have reduced Schumpeter's "process of creative destruction" to a rule-following procedure. In transforming innovation into a higher-level routine, the Schumpeterian "entrepreneur" simply becomes an agent who engages in a more elaborate form of search behavior. What I have urged in this paper about the limitations of search theory in the description of behavior in the market process is equally valid with respect to NW's formalized Schumpeterian "entrepreneur" (namely, search theory presumes that searching agents know the probability distribution of outcomes without first explaining how these agents acquire this knowledge). That this applies to NW's model is confirmed by recalling that NW's process of innovative competition takes place within the confines of a (perhaps imperfectly known) probability distribution and a sample space of possible outcomes.[25] It is not surprising, then, that NW seem to downplay certain features that one tends naturally to associate with creative entrepreneurship—e.g., "genius" or "luck" [29, 134].[26] By making the central concern the relative success with which agents are able to cope with various degrees of complexity in (in some sense) known data, NW regrettably divert attention away from the crucial role of entrepreneurial discovery.

Contrasts: Normative Theory. These fundamental differences appear even more starkly in the normative analysis. NW's discussion of the socialist calculation debate is particularly enlightening in this regard. At first, they cite with approval the Mises-Hayek position in the debate, as a representative of the "classical" attitude that appreciated the problems of calculation and control [29, 360]. NW then criticize that position however, on the grounds that its "informal" character

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known. Although some choices may be clearly worse than others, there is no choice that is best *ex ante*" [29, 276]. This statement can be reconciled with the quotation that appears previously in the text by recalling the actual formal model that NW present. In that model, agents were essentially choosing from an urn filled with possible new routines, some better than others. The statement above simply means, then, that choice sets are "not given" only in the sense that the consequences of any draw are not known with absolute certainty but are known probabilistically.

23. Actually, in NW's framework, uncertainty and complexity appear to be largely interchangeable, either one forcing the agent up against the limits of rationality.

24. I would like to acknowledge Estéban Thomsen for enlightening discussion on these and other points in this section. For further elaboration on these matters, see Thomsen [34].

25. Although they do cite Knight in their discussion of the role of uncertainty with respect to bounded rationality [29, 31], Knightian uncertainty (what Richard Langlois has termed "structural uncertainty" [22]) plays no part in their actual model.

26. On the relation between luck and entrepreneurship, see Kirzner [16, 154–81].

permitted a "too facile" defense of the market economy, and obfuscated serious theoretical gaps that only a more "formal" treatment could adequately address [29, 362]. For example, they state that

> arguments in the Hayekian vein often seem to have in view an image of private-enterprise institutions that is both narrow and idealized. [. . .] It is essentially an image of a collection of geographically dispersed spot markets in which atomistic competition prevails. But we know that the private-enterprise "solution" to the problem of economic organization is not always a market solution; for better or for worse, it clearly involves large elements of centralized planning and direction within the boundaries of large private corporations. It is rarely an atomistically competitive solution [29, 364].

A close reading of Hayek [6; 8; 9; 11], however, would leave one puzzled with the above passage. Surely in his 1937 essay on "Economics and Knowledge," for example, it is precisely the narrowly structuralist (atomistic) theories of competition, which concentrate on the conditions for a competitive equilibrium (i.e., the number and size distribution of firms), that was the object of Hayek's sharp criticism. Certainly nowhere in his more recent essay on "Competition as a Discovery Procedure" [11] are we asked to accept as a precondition for successful market competition an atomistic structure. Furthermore, that they view private corporations, operating in a market environment, as engaging in central planning of essentially the same kind that von Mises and Hayek were arguing most strongly against, suggest that NW have discerned less than the full lesson of the calculation debate, and, indeed, have seriously misunderstood it at critically important points.[27] Brian Loasby, in another context, may have perhaps put his finger on part of the problem when he wrote that "it is one of the greatest dangers of economic formalism that it leads to arrogance—usually unconscious arrogance: an assumption that formal models better express the vision of a great mind than its own writings" [25, 177].

This is certainly not to diminish the accomplishment of NW or to deny that economists of all stripes have much to learn from them, including market-process theorists. In particular, their unusual perspective on the normative properties of monopoly that goes beyond the static deadweight loss analysis—which unfortunately I cannot pursue in this paper—could well be a source of important new insights for a monopoly theorist working within the MPF [13, ch. 4].

IV. Summary

Fisher's highly insightful model of the stability of a general equilibrium system shares much common ground with the MPF. There is an aspect of his model, however, that harkens back to the Schumpeterian notion of the steady state, which, following the occasional disturbance by an innovating entrepreneur, is re-established via an optimal (equilibrium) adjustment path. In this sense, his model has the flavor of a dynamic-equilibrium analysis. But by rigorously specifying the highly unrealistic assumptions necessary for convergence to a general equilibrium (e.g., "no favorable surprise"), Fisher's analysis may ultimately serve to dampen somewhat the prevail-

27. Of course, the majority of historians of thought have shared in this lack of understanding and appreciation. Lavoie [24] provides an excellent overview of the calculation debate. While Hayek and von Mises may themselves be partly responsible for this state of affairs, modern Austrians would hardly subscribe to the purported virtues of atomistic competition. See for example Kirzner [16, ch. 1 and 2; 17] and O'Driscoll and Rizzo [30, ch. 6 and 7]. I am not here arguing that large modern corporations have no bureaucratic characteristics, but that like so many others Nelson and Winter have misunderstood the essence of the Mises-Hayek position in the calculation debate.

ing fascination with equilibrium constructs. A less Schumpeterian and more Kirznerian view of entrepreneurship might bring Fisher even closer to the market-process approach described in this paper, for moving away from the notion of entrepreneurship as a disrupter of steady states could deepen appreciation for its coordinative aspect, which both maintains the market order and drives the process of discovery.

Nelson and Winter's evolutionary theory of economic change appears to come remarkably close to the MPF, as do their cogent observations and criticisms of the weaknesses in the neoclassical orthodoxy. Moreover, the positive and normative theoretical responses to these weaknesses strike a familiar chord in market-process theorists. Regrettably, they seem to have overlooked, just as the neoclassical orthodoxy has, the essential message of the MPF: that competition is a process of entrepreneurial discovery. That is, NW address neither the question of how agents initially perceive the (perhaps complex) underlying data nor how agents ultimately decide upon the rules of thumb that filter data already perceived. In failing to do so, NW have left standing, indeed they have bound themselves to, a third pillar of orthodox economics: *that agents possess complete (certain or probabilistic) knowledge of their ends-means decision framework.* Evolutionary theory addresses directly the question of "What are the implications for the catalaxy of changes in data relevant to agents' decisions when they know the data have changed?" rather than "What are the implications of these changes when agents are initially unaware of such changes?" It is the second type of question, of course, that is the starting point for most investigations in the MPF. On this basis, then, we must still distinguish evolutionary theory from market-process theory. Nevertheless, evolutionary theory, by raising and exploring critically important questions and offering intriguing answers, can yet serve to inspire and direct economists of all persuasions in their researches.

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