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Information and Knowledge: Austrian Economics in Search of its Uniqueness

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Abstract. The Austrian School of Economics since WWII has increasingly claimed a unique position within the scientific community of economists. This paper argues that the most persuasive way to make this claim to uniqueness is to focus on the distinction scholars in the Austrian tradition place between information and knowledge in their work. In other words, it is the epistemic-cognitive turn that the Austrian school took in the wake of the socialist calculation debate that separates the school from other branches of neo-classicism within economic science that constitutes its best case for analytical uniqueness.

Key Words: Austrian economics, knowledge, information, entrepreneurship, market process

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> I am wiser than this man; it is likely that neither of us knows anything worthwhile, but he thinks he knows something when he does not, whereas when I do not know, neither do I think I know; so I am likely to be wiser than he to this small extent, that I do not think I know what I do not know.
>
> Socrates[1]

Since the mid-1930's, Austrian economics has found itself in a strange position with regard to the mainline of economic thinking. Many of the theoretical innovations introduced by scholars working within the Austrian tradition were understood by economists to be fully incorporated into standard neoclassical economics by the early 1930s. Developments in economic thinking during the 1930s in retrospect call that claim into question. No doubt that many economists in the 1930s understood that tastes were subjective, that microeconomic analysis must be grounded in methodological individualism, that production plans must be coordinated with consumption demands through time, and that the incentives which the market economy engenders possess strong self-regulating tendencies. Lionel Robbins' (1932) statement of the methodology and methods of analysis neatly summarized the main Austrian tenets for an English speaking audience and was widely accepted by economists.

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But in the wake of the Great Depression, this orthodox consensus broke down. The New Economics of Keynes decidedly moved away from the methodological individualist position and questioned the self-regulatory robustness of the market economy. Instead of relying on market forces to self-correct for errors in investment, the government was given the policy role of correcting for market instability.

In addition to the Keynesian revolution in macroeconomics, economists started to develop arguments about the microeconomic inefficiency of the market economy. The theories of imperfect competition and monopolistic competition were developed by Edward Chamberlin and Joan Robinson during the 1930s. Moreover, the argument of Adolph Berle and Gardiner Means about the separation of ownership and control within the modern corporation was presented to suggest another way in which the modern era deviated significantly from the earlier model of capitalist efficiency. Finally, these macroeconomic and microeconomic arguments served as the background for the emerging argument for market socialism as developed by Oskar Lange and Abba Lerner.[2] The underlying logic of Lange's model was that through the use of standard price theory he could demonstrate the *theoretical* possibility of market socialism, and given this demonstration the *practical* desirability of market socialism over the instability and inefficiency of real world capitalism.

In the wake of both the rise of Keynesianism and market socialism, Mises and Hayek started to emphasize the nuances with the Austrian understanding of the market economy that had tended to be glossed over in the pre-1930s intellectual climate in economic science. The work by Mises stressed the dynamic and competitive entrepreneurial process, while Hayek stressed the informational processing capability of the market economy. Both stressed the necessary institutional conditions for these arguments to hold—namely, private property, freedom of contract, and limited government. Moreover, both made favorable reference to each other's arguments as essential components to forming a correct understanding of the nature of the market economy.[3] It was not just that the Keynesian, monopolistically competitive, and market socialist arguments were politically wrong, they were wrong because they were built upon a foundation of economics that fundamentally misconstrued economic life.

Ironically, during the 1930s and 1940s, both Mises and Hayek maintained that their understanding of economic life represented the *mainstream of economic thinking*. It was really only with the generation of Austrian economists trained in the 1950s (namely Murray Rothbard and Israel Kirzner) that the idea of a modern and unique Austrian school of economics began to take hold of the imagination of scholars.[4] But what exactly were the defining characteristics of this unique school of thought?

Murray Rothbard (1962) emphasized the rejection of mathematical modeling and statistical inference as the basic tools of economics analysis. Rothbard, instead, focused on the consistent application of methodological individualism and methodological subjectivism. The defining characteristic, in other words, to Rothbard was the praxeological method—including a firm commitment to apriorism. Israel Kirzner (1973), while not disputing the claims of Rothbard, emphasized the uncertainty inherent in all economic decisions and the entrepreneurial nature of the market process. Ludwig Lachmann (1977), who was also a significant contributor to the literature on a unique Austrian school, emphasized the radical subjectivist stance. In Lachmann's mind the Austrian school matured with each step

along the consistent adoption of subjectivism—the move from subjectivism of value to subjectivism of expectations.[5]

While not disputing the arguments put forth by Rothbard, Kirzner and Lachmann, I want to suggest that perhaps Austrians ought to ground their argument for uniqueness not along methodological grounds, but instead in their analytical contributions to our understanding of the epistemic-cognitive properties of alternative institutional arrangements. It is this recognition of the contextual nature of the relevant economic knowledge that actors must work with within an economic system that represents the unique contribution of the modern Austrian school to our understanding of the price system and the market economy.

Distinguishing Knowledge and Information

Two major developments in economic theorizing occurred when time and information were incorporated into the analysis of the market economy. Rather than a static and full information world, economists were set to analyze action in time and the acquisition of information. But in order to accommodate these factors into the standard model the strategy followed was to treat time and information as either constraints or objective commodities.[6] Information, for example, was divided into bits and pieces dispersed throughout the economic system which maximizing agents must acquire in making a decision.

Standard models of search presume that agents follow Bayes law for updating their priors as they learn through the search process. This guarantees that the actors are not merely passive reactors to given information, but instead are willing to adjust their priors as they acquire more information. The general rule is that they will continue to collect information until the expected marginal benefit of continued search equals the marginal cost of continuing the search.[7] While adjustment through learning is evident in the basic model, the actors in the model are nevertheless rather mechanical learners. "Nothing will ever occur," Stephen Littlechild has pointed out, "for which they are not prepared, nor can they ever initiate anything which is not preordained" (1977:7). Interpretation and skillful judgment in the face of the unforeseen, not to mention creativity, are not captured in the Bayesian learning process.

Standard search theory, while clearly an improvement over the full information models that preceded it, tends to rely on its own form of complete information. The model presupposes that the underlying probability distribution is known to agents and that the question is one of them searching for information under conditions of risk, not uncertainty (in Knight's sense). In short, complete information is available, but agents are imperfectly informed and have to engage in a deliberate process of gathering the information that is relevant to their decision-making.

As information economics developed, Austrian writers repeatedly raised the distinction between risk and uncertainty to distinguish their position—in many instances calling upon Mises' distinction between case and class probability in human decision-making to make their point. It is not my point to rehash this position, with which I am in essential agreement, but to insist that the semantic point about the meaning of risk and uncertainty is *not* what is driving the Austrian criticism. Instead, the point is raised by writers in this intellectual tradition because there is something fundamental about the price system and the market economy that is lost when information and learning is treated in a mechanical manner.

Identifying precisely what is lost in the explanation will lead us to what is unique about the Austrian research program on the market economy. I am going to argue that the definitions of knowledge and information are really what underpins the dispute. Semantic disputes have often bogged down progress in economics.[8] A prominent example would be the capital theory debates in the 1930s and 1940s, where Knight thought of capital in monetary terms, while Hayek thought of capital in goods terms. Of course, in monetary terms capital is homogenous, but in goods terms capital is heterogenous. But Knight and Hayek talked past each other (see Boettke and Vaughn 2002).

Economics, as all specialized fields, has its own jargon. Economists often redefine terms to fit with their meaning. Elasticity is a term we use to describe how sensitive human behavior is to changes in price is a favorite example—why not just use the word sensitive? Textbooks often use the term sensitivity in the definition of elasticity. Competition is another favorite example in the Austrian literature. Textbook economics uses the term competition to define a state of affairs where in fact the activity of competition ceases. Well, I want to suggest that the terms information and knowledge have also been translated into economic language in a manner that distorts their standard meaning. In order to incorporate information and knowledge into the standard economic model, the concepts were conflated and treated as a commodity that was *deliberately* bought and sold in the market.

In *Webster's College Dictionary* information is defined as: "the communication or reception of knowledge or intelligence; knowledge obtained from investigation; facts or data." Knowledge, on the other hand, is defined as: "the fact or condition of knowing something with familiarity gained through experience or association; acquaintance with or understanding of a science, art, or technique; the range of one's information or understanding." In short, information is a flow concept, while knowledge is a stock notion. However, economists have tended to view information as both a stock and flow and eliminate the discussion of knowledge as discovery of the previously unknown.

The Austrians objected to this conflation of information and knowledge, but since Hayek had already used the term knowledge in his 1937 and 1945 essays to connote the use of existing as well as the discovery of new knowledge, and the term information was already being employed in a particular way by other economists to describe objective bits, they tended to employ the term knowledge to discuss the subjective component, the discovery factor, and the tacit domain. Knowledge is ever changing and is multifaceted, while information is something fixed. In other words, information is the stock of the existing known, while knowledge is the flow of new and ever expanding areas of the known. As G. L. S. Shackle put it "So far as men are concerned, *being* consists in continual and endless fresh *knowing*" (1972:156). While the Austrian, or subjectivist, definition of knowledge as a flow flies in the face of the dictionary definition, it does distance itself from the conflation of information and knowledge that exists in the standard textbooks.

To illustrate the difference perhaps the following example might work. Consider a basic learning by doing model and the example of solving a technical issue in engineering. A student at MIT given a certain problem realizes that the answer lies in a textbook somewhere on the library shelves, but does not know in which book the correct formula is to be found. A standard search model can be deployed. Our MIT student will search the textbooks to find the needed formula up to that point where the expected marginal benefit of continued search

equals the marginal cost of continued search. As our student progresses from freshman year to senior year they get more proficient in doing these searches. But what is absent from this exercise is that as our engineering student works with the existing texts, she may well be in the process of creating the *new* texts that will occupy the library shelves as she utilizes the existing information to solve different problems or to launch new avenues of inquiry that were previously unthought. The Austrians want to emphasize not just the proficient use of existing information, but the discovery and use of *new* knowledge that comes into being only because of the context in which actors find themselves acting.[9]

In addition to a discussion of the discovery and use of knowledge, the Austrians have often emphasized another dimension absent from standard treatments of information—the interpretation and skillful judgment embodied in the use of knowledge. It is often remarked about the Internet now-a-days, that information is vast, but knowledge is scarce. This phrase gets at the basic Austrian concern. In making economic decisions, we do not just passively react to information, but must actively interpret the information we receive, and pass judgment on its reliability and its relevance for our decision-making.

If you are looking for the unique Austrian research program, I contend, it is to be found in this emphasis on these knowledge aspects of the economic process. Of course, there are other differences between Austrian economists and their neoclassical brethren. Some of these differences are vital. But the claim to the uniqueness of the Austrian contribution lies, I believe, in the treatment of information and knowledge.

Information and Knowledge within the Austrian Literature

To illustrate my point I plan to examine the discussion of information and knowledge in the work of four major Austrian economists—Hayek, Machlup, Kirzner and Lavoie. A more ambitious task would be to also discuss Mises' (1922, 1949) contributions to this literature because his treatment of economic calculation, the intellectual division of labor, and the entrepreneurial market process is the genesis of these later contributions. But Mises did not explicitly distinguish between information and knowledge in his work since the conflation of the terms was not yet fully evident in the economics literature.

Hayek's research program took the "knowledge" turn with his essay "Economics and Knowledge" published in 1937. I interpret the main point of that essay to be that the knowledge that defines the equilibrium state of affairs emerges within the process leading to that equilibrium state rather than existing anterior to that process. Without the market process to generate it, the relevant knowledge would not exist. Economists, Hayek warned, cannot continue to assume given knowledge. A secondary point of that essay was to suggest that while the logic of choice is a necessary component of an explanation of the market process, but it is not sufficient. The logic of choice must be complimented with empirical examination of how learning takes place within alternative institutional settings. Within a private property order, the competitive market process will direct economic actors—all pursuing their own individual logics of choice—to engage in activities that will dovetail with the actions of others to coordinate plans through time. Outside the context of the private property order, Hayek contended, the individual pursuit of their goals is not powerful enough to ensure plan coordination. In fact, it is in this 1937 essay that we first get a

statement of a theme that Hayek will emphasize throughout his career—namely, that what we call economic rationality emerges because of a certain institutional setting and is not a behavioral postulate of economic analysis.

Hayek's most famous essay "The Use of Knowledge in Society" pursues a slightly different approach to these issues. Aspects of his essay emphasize the informational efficiency of the price system. His famous tin example, for example, highlights how the price system economizes the amount of information that economic actors must process in order to act successfully within the market. It is this insight that many economists within the information economics research program have picked up from Hayek and examined. But Hayek also emphasized in that 1945 essay that the knowledge of the market process is not of the type that can be treated as a statistic and instead is knowledge of particular time and place that agents deploy in making their decisions on the spot. Agents outside of a particular institutional context, do not have the relevant knowledge for decision-making within that context. Knowledge, in other words, is concrete and contextual and not abstract.

Starting in the 1950s, Fritz Machlup began a series of studies on innovation and the knowledge industry. In these works, Machlup defines knowledge as a commodity and attempts to measure the magnitude of the production and distribution of this commodity within a modern economy. In short, Machlup was the first modern economist to address the question of the "information economy" that is so often talked about today. Machlup divided the knowledge industries into five categories: (1) practical knowledge; (2) intellectual knowledge; (3) pastime knowledge; (4) spiritual or religious knowledge; and (5) unwanted knowledge. In *The Production and Distribution of Knowledge in the United States*, published in 1962, Machlup estimated that knowledge production in 1958 was almost 29 percent of GNP. Later work following up on Machlup estimates that the growth of the knowledge industry was actually quite modest as compared to other components of GNP. The knowledge industry went from 29 percent in 1958 to 34.3 percent of GNP in 1980.

However, Machlup's division of the knowledge industry into various categories does not address the question of knowledge of time and place, the importance of interpretation and skillful judgment. Thus, while Machlup certainly contributed to our understanding of knowledge as a commodity, he did not address the questions Hayek sought to reorient economic research upon.

Throughout the 1960s and 1970s, Israel Kirzner, building on the work of Mises and Hayek, developed his theory of the entrepreneurial market process. Entrepreneurs in Kirzner's understanding of the market economy represent the driving force that ensures the relative efficiency of competition processes within a system of clearly defined and strictly enforced private property rights. The entrepreneur perceives previously unrecognized opportunities for mutual gain and by acting on them directs the economic system to a more coordinated state of affairs than had previously existed. In short, entrepreneurial arbitrage is the equilibrating force within the market economy.[10]

In the process of articulating his theory of entrepreneurial behavior, Kirzner had to revisit the issues of knowledge that Hayek raised in his 1937 and 1945 essays. Kirzner tended to emphasize two aspects of knowledge, which do not permit it to be treated as a fixed commodity. First, Kirzner's entrepreneurial theory emphasizes the subjective perception of

opportunity. A profit opportunity that is known to all, will be realized by nobody; so while all actors possess some aspect of entrepreneurial alertness, they cannot all be alert to the same opportunities with the same level of proficiency in alertness. This differential recognition of entrepreneurial opportunities for profit raises the issue of contextual knowledge within the competitive market process. This context dependent nature of our knowledge is the second aspect of knowledge that Kirzner's theory of the entrepreneurial market process raises. Unfortunately, Kirzner does not address this aspect head-on.

Don Lavoie picked up on Kirzner's work on the nature of the entrepreneurial market process and revisited the socialist calculation debate and the problems of centralized economic planning (1985a). In his follow-up book on piecemeal economic planning, Lavoie (1985b) reinforced the ideas of Mises, Hayek and Kirzner with the theories of knowledge of Michael Polanyi to show that the knowledge-problem critique of socialist central planning applied with equal force to supposedly more modest attempts at National Economic Planning, such as Industrial Policy.[11] The tacit domain of our knowledge addresses the issue of context, but does so in a manner that focuses on learned and skillful judgment in the use of knowledge. "Learning," Lavoie writes, "is an enhancement of our interpretive powers and our tacit understanding of an unfolding reality rather than the simple accumulation of data" (1985b:58).

In Lavoie's writings we get an explicit treatment of the market as a cognitive process. Not only does the price system economize on the information economic decision-makers must process, but the entire market system generates a level of social intelligence that no one mind or group of minds could approximate.[12] These insights of Lavoie, however, are blurred in treatments that conflate information and knowledge and treat the universe as essentially known rather than in a constant flux of unending discovery.

Hayek's emphasis on the market as a device for social learning, and in particular the role of entrepreneurial competition in stimulating that learning, is developed by Lavoie and harnessed to address the arguments for comprehensive central planning (e.g., Marxian central planning), aggregative notions of planning (e.g., Leontif Input-Output analysis) and piecemeal planning (e.g., industrial policy, etc.). The data that is relevant for the most essential decisions within a market economy, Lavoie contends, is fundamentally uncollectable and is embedded instead in the decisions of time and place and acted upon by decision-makers through their active interpretation and the exercise of skillful judgment.

Information Economics and the Market Process

The awarding of the Nobel Prize to Joseph Stiglitz, George Akerlof and Michael Spence in 2001 was richly deserved. Information economics has transformed the way economists think about the economic system. I will not comment on Spence's essential writings on signaling in labor markets, but restrict my comments to Stiglitz and Akerlof because they raise the issue of the connection between information asymmetries and market failure.[13] If the market is viewed as an epistemic-cognitive process, as I contend the Austrian writers tend to do, then asymmetries are what drive the entrepreneurial process. The successful entrepreneur perceives the imperfection in the current arrangement of affairs more accurately than others, and he acts upon that information to earn a profit and in so acting brings new knowledge

into existence. In others words, today's inefficiency is tomorrow's profit opportunity for those who recognize it and act upon it to better satisfy the demands of consumers.

In Stiglitz's work on the informational efficiency of the market system (mostly written with Grossman), he argues that private information once revealed will become public information and thus the private information which an agent has that could be used to their benefit will cease to be valuable once publicly revealed through the market. This leads him to conclude that markets will underproduce the requisite information for the efficient allocation of resources. It is my contention that this argument overestimates the efficiency of equilibrium prices, and completely disregards the informational content of disequilibrium prices. To Stiglitz, the dynamic adjustment processes that disequilibrium prices set in motion are simply ignored in his treatment of the market economy. In Stiglitz's theory, the efficiency postulates attributed to the competitive model are highly fragile to deviations from the ideal conditions.[14] The Austrian's, on the other hand, argue that the competitive market process is highly robust with regard to its efficiency properties even in situations far from the ideal. Today's inefficiency is tomorrows profit opportunity for those who act to improve the situation and bring the underlying variables of tastes and technology more in line with the induced variables of prices and profit and loss that exist on the market. Stiglitz argues for fragility because the price system is informationally inefficient, whereas the Austrians contend that disequilibrium prices spur economic actors to adjust their behavior in a less erroneous direction than before.

Akerlof's discussion of "lemons" suffers from the same sort of problem I suggest plagues Stiglitz's system.[15] Admittedly, Akerlof does raise the market responses to lemon's problems in passing in his famous paper, but he does not really emphasize those institutional responses to the potential problem of asymmetry. What Akerlof perceives as problems in market systems have actually given rise to entrepreneurial solutions, as private actors situated in particular time and place have adjusted their behavior to realize the mutual gains from exchange. As Hayek (1948:103–104) argued: "The confusion between the objective facts of the situation (e.g., Akerlof asymmetries) and the character of human responses to it tends to conceal from us the important fact that competition is the more important the more complex or 'imperfect' are the objective conditions in which it has to operate. Indeed, far from competition being beneficial only when it is 'perfect,' I am inclined to argue that the need for competition is nowhere greater than in fields in which the nature of the commodities or services makes it impossible that it ever should create a perfect market in the theoretical sense."

It is competition that prods actors to behave in a manner more conducive to "rationality" and the coordination of economic plans. Without the competitive market process, the knowledge necessary for actors to plot their course in the economic sea of possibilities would not exist. It is not that it would be difficult to find, it is literally that the knowledge would remain unknown. It is the ability of the market process to reveal hitherto unknown possibilities and spur economic actors to act upon this new and fresh knowledge to better themselves by satisfying the demands of others that lies at the heart of the comparative institutional case for the market economy as a superior institution for coordinating our economic affairs.

It is the contention of the Austrians, from Hayek to Lavoie, that, as Kirzner writes, "the market performs a crucial function in discovering knowledge nobody knows exists; that an

understanding of the true character of the market process depends, indeed, on recognizing this crucial function; and, finally, that contemporary economists' unawareness of these insights appears to be the result of otherwise wholly laudable attempts to treat knowledge objectively—that is, as consisting entirely of units of available information that are to be acquired only through calculated expenditure of resources" (1979:139).

Conclusion

The Austrian economists have indeed found themselves in a strange position since the 1930s. Prior to the 1930s, the contributions of the economists from Vienna were widely recognized as significant advancements in the emerging neoclassical hegemony. However, during the 1930s the Austrians were blindsided by two forces. First, the new economics of Keynes seemed to be a step backward from the neoclassical economics the Austrians were part of, yet younger economists and policy-makers flocked to the Keynesian system. Mises and Hayek thought this popularity would be short-lived given that the theory was grounded in an economics of abundance and was really only a policy-doctrine for the time, rather than a refinement of neoclassical economics. Little did they know the sway that Keynesian doctrine would hold in the scientific and public policy communities for over forty-years. Second, Mises and Hayek were taken aback again by the use of neoclassical arguments, namely Walrasian equilibrium theory, to argue in favor of market socialism. In the market failure literature the models of imperfect and monopolistic competition and the Berle-Means hypothesis about the separation of ownership and control were deployed to question the efficiency of the market economy. The Walrasian conditions for market efficiency were then adopted for the model of market socialism, and the argument was made that socialism could achieve in theory exactly the same results as capitalism could, and in practice it could out perform capitalism.

To Mises and Hayek these arguments must have seemed as not just wrong, but intellectually bizarre. Somehow neoclassical economics had taken a drastic turn for the worse. In trying to figure out how this turn took place, Mises and Hayek embarked upon a very innovative stage of their careers as they separately articulated the nature of the entrepreneurial market process and the cognitive function that process served. Most economists failed to appreciate the innovative nature of the work of Mises and Hayek in the 1940s. Many fail to do so to this day.

It has been my contention that the innovative aspect of their work is to be found in their discussions of knowledge and the distinction between knowledge and information that follows from their work. By focusing our analytical attention on our cognitive imperfections, Hayek sought to articulate how we can cope, and in fact exploit, this situation to realize the unforeseen and unpredictable from which we will benefit as the course of events unfolds through time. "If there were omniscient men," Hayek wrote in *The Constitution of Liberty*, "if we could know not only all that affects the attainment of our present wishes but also our future wants and desires, there would be little case for liberty. And, in turn, liberty of the individual would, of course, make complete foresight impossible. Liberty is essential in order to leave room for the unforeseeable and unpredictable; we want it because we have learned to expect from it the opportunity of realizing many of our aims. It is because every

individual knows so little and, in particular, because we rarely know which of us knows best that we trust the independent and competitive efforts of many to induce the emergence of what we shall want when we set it" (1960:29).

Notes

1. From Plato, Apology 21d on p. 21 of John M. Cooper, ed., Plato: Complete Works (Indianapolis: Hackett Publishing, 1997). I am using this quote in the hope of capturing for the reader three possible cognitive states we human beings find ourselves in. There are times when we act when we know that we don't know (rational ignorance); when what we think we know ain't so (stupidity); and when we don't know that we don't know (utter ignorance). Standard search theory reduces our cognitive condition to one of rational ignorance, the work of my colleague Bryan Caplan (2001a and 2001b) tends to focus on how even stupidity can be rational within certain institutional contexts, while the writings of the Austrians tend to focus on utter ignorance of human beings and how the institutions of the market arise to cope with this ignorance even though the actors themselves could not know these institutions serve this function. In fact, I think one way to put Hayek's main contribution to our understanding of the price system is that we benefit from its functioning without having to be aware of its functioning. It is my contention that while all three cognitive states exist, recognizing our ignorance is an essential step in developing a theory of the creative market process that has been the main theoretical task the Austrian economists have taken upon themselves in the post-WWII period.
2. For a documentary history of the socialist calculation debate (see Boettke (ed.) 2000).
3. On the close intellectual relationship between Mises and Hayek with regard to the argument against socialism (see Boettke 1998). A contrasting point of view is presented by Salerno (1990 and 1993).
4. See Boettke and Leeson (2003) for a discussion of the evolution of modern Austrian economics since 1950 and the resistance Mises and Hayek demonstrated to the idea of a unique Austrian school. As late as the 1960s, Mises and Hayek still both argued in print that the main contributions of the Austrian school had been fully absorbed into the mainstream of economic thinking.
5. Perhaps the most illuminating way to see the common-ground, as well as the differences, between Rothbard, Kirzner and Lachmann, is to examine their different contributions to the volume edited by Edwin Dolan entitled *The Foundations of Modern Austrian Economics* (1976). In the decade following this volume, the differences were highlighted, but there was also a large degree of common-ground that has tended to be forgotten in the subsequent literature. That common-ground consisted of a commitment to methodological individualism, methodological subjectivism and the notion of the market process as opposed to the equilibrium economics. The implications of these commitments included the rejection of the mathematical method as the primary tool for theory development and the rejection of standard techniques of statistical inference for the testing of theory. Logic and evidence were championed by Rothbard, Kirzner and Lachmann, in their scientific work in economics, but natural language and traditional historical scholarship was employed rather than mathematical modeling and statistical analysis.
6. For a criticism from an Austrian perspective of standard economic treatments of time and information (see O'Driscoll and Rizzo 1985).
7. Kirzner makes an important point with regard to standard search theory that the theory cannot "avoid making the assumption that, before undertaking the search, one *already* knows enough about the territory to be able to calculate rewards and costs. So that, if we are to view the acquisition of knowledge as deliberately undertaken, one must postulate some prior knowledge *not* acquired through deliberate search or learning activity" (1979:142). The paradox of knowledge, what Kirzner calls the Boulding-Shackle paradox, is that in discussing the acquisition of knowledge in a deliberative manner we must know what it is that we want to know before looking for it. But this notion of knowledge misses completely the idea that there is knowledge that we ought to know, that we do not know. Kirzner, as we will see, argues that it is precisely the entrepreneurs function within a market economy to discover that which was previously unknown.
8. Samuelson used to argue that the two major sources of confusion in economics are (1) calling the same thing different names, and (2) calling different things the same name. He, of course, used this argument to advocate the use of mathematics to eliminate ambiguity. But as Kenneth Boulding pointed out in reviewing Samuelson's *Foundations* "Conventions of generality and mathematical elegance may be just as much barriers

to the attainment and diffusion of knowledge as may contentment with particularity and literary vagueness... It may well be that the slovenly and literary borderland between economics and sociology will be the most fruitful building ground during the years to come and that mathematical economics will remain too flawless in its perfection to be very fruitful" (1948:247). Boulding's prediction has proven prophetic. Nevertheless, I do think Samuelson's point about the two sources of confusion are valid and relevant to the current discussion even if I think it is precisely the mathematical modeling research strategy that was followed by Hurwicz, Radner, and Stiglitz et al., that produced many of the problems I am going to highlight with regard to information economics.

9. Hayek (1973–1979, III, 190, fn. 7) sums up the position nicely when he writes: "Even the statement of the problem as one of utilizing knowledge dispersed among hundreds of thousands of individuals still over-simplifies its character. It is not merely a task of utilizing information about particular concrete facts which the individuals already possess, but one of using their abilities of discovering such facts as will be relevant to their purposes in particular situations. This is the reason why all the information accessible to (rather than already possessed by) the individuals can never be put at the disposal of some other agency but can be used only if those who know where the relevant information is to be found are called upon to make the decisions. Every person will discover what he knows or can find out only when faced with a problem where this will help, but can never pass on all the knowledge he commands and still less all the knowledge he knows how to acquire if needed by somebody else."
10. This claim, of course, was the source of the great debate in Austrian economics between Kirzner and Lachmann that dominated the intellectual agenda between the mid-1970s and mid-1980s (see Vaughn 1994:112–161).
11. Lavoie also emphasizes the problem of power inherent in planning efforts. As he stated: "Planning does not accidentally deteriorate into the militarization of the economy; it *is* the militarization of the economy" (1985b:230).
12. Lavoie (1985b:65–76) uses an argument by analogy to discuss the generation of social intelligence in an ant colony, the market system and the scientific community. In each case, the emergent order described are not merely complex orders, but orders which achieve a level of complexity that extends beyond that attainable to constituent parts. In short, the whole is greater than the sum of its parts; "social intelligence that is greater than the intelligence of any of its individuals" (1985b:66).
13. Representative publications of Stiglitz and Akerlof include Stiglitz, *Whither Socialism*? (1995) and *An Economic Theorists Book of Tales* (1984).
14. My colleague Bryan Caplan is fond of pointing out the fallacy implied in Stiglitz's argument. Caplan points out that the assumptions normally thought of as necessary for general competitive equilibrium are really just sufficient conditions. If you have those ideal conditions, you will have a general competitive equilibrium, but the absence of those conditions does not necessarily imply that general competitive equilibrium will not be achieved (even if that result is more unlikely).
15. For an examination of Akerlof's lemons arguments and a proposed Austrian market process theory response (see Mark Steckbeck and Peter Boettke 2001).

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