

New York University

From the Selected Works of Mario Rizzo

September, 1996

Economics of Time and Ignorance: 1996 Intro Survey

Mario Rizzo

Introduction

Time and Ignorance After Ten Years

Mario J. Rizzo¹

[W]e all try hard to avoid error . . . Yet to avoid error is a poor ideal: if we do not dare to tackle problems which are so difficult that error is almost unavoidable, then there will be no growth of knowledge. In fact, it is from our boldest theories, *including those which are erroneous*, that we learn most. *Karl Popper (1979, p. 186)*

In her recent history of the contemporary Austrian school, Karen Vaughn says that after 1985, the original publication date of the present book, "it [was] impossible to think of Austrian economics as anything but the economics of time and ignorance" (1994, p. 134). While it would be too generous to attribute this development primarily to our book, her statement does express an important truth. Austrian economics has changed in the past ten years and that change has been positive. Austrians have now become among the most creative, innovative and least doctrinaire of economists.² While the neoclassical mainstream continues to spin its wheels, "Austrians" (meaning the broad subjectivist and market-process school of thought) are asking and answering deep questions at the frontier of social-scientific knowledge.³ They understand that application of the mechanistic model of nineteenth-century physics may well have reached the limits of its useful contributions. They are not afraid to challenge many widely, but passively, accepted beliefs among economists. They know that the twentieth century is almost at an end and that not all of its intellectual developments have been beneficial. They understand that a new century will demand not only "new" techniques (perhaps many of them being old techniques) but also new divisions among academic disciplines (Rizzo, 1992, pp. 246–8). The

questions and answers proffered by many of today's economists might comfortably find a home as a kind of "social physics" (Comte, 1988: p. 13).⁴ On the other hand, some of the efforts of Austrians and others whose conception of economics is rooted in the realistic intentions and purposes of agents might be appropriately considered, without derogation, a "philosophical" economics.⁵

For our present purposes, however, it is important to understand the sense in which Austrian economics has become the economics of time and ignorance. The reader will recall that the term "economics of time and ignorance" is derived from Keynes' "dark forces of time and ignorance." Of course, this does not mean that Austrian economics has become the economics of John Maynard Keynes. (How ironic that would be!) Although we find elements in Keynes' analysis that are subjectivist, deeply insightful and congenial to our way of thinking, we are not Keynesians. We choose Keynes' expression because he understood, at least much of the time, the importance of the basic problems with which real time confronts individual actors. To say that Austrian economics is the economics of time and ignorance is to say that it is the economics of *coping* with the problems posed by real time and radical ignorance. Although individuals are not paralyzed by these problems, they do not automatically or completely overcome them. The behavior generated by this predicament in which human beings find themselves is a source of market phenomena and institutions. It is also the source of prudential limits to our institutions, both markets and governmental. Human beings are "prisoners of time" (Shackle, 1970, p. 21). This prison acts not only as a constraint (the allocational aspect of time) but also as a formulator of experience, thus generating and limiting our knowledge.

If we take time seriously, it is hard to imagine Austrian economics as merely "a supplement to neoclassical economics." This represents the least the Austrians have to offer (Vaughn, 1994, pp. 165–8). Some neoclassical economists may be able to make improvements in their analyses by formalizing (and thus transforming) the insights to Menger, Hayek or others. But this is not the essence of the Austrian contribution to knowledge about the social world. Austrians ask different kinds of questions and provide different kinds of answers. This is not to say that they may not sometimes ask the same or similar questions or that their vocabulary might not be at least superficially similar to that of the neoclassical mainstream. It is to say, however, that Austrian economics is essentially a different enterprise from neoclassical social physics.

The ways in which Austrian economics has changed over the past ten years focus, as we shall see, on the ideas of time and ignorance. *Why* have time and ignorance become so important within Austrian economics?

Most, if not all, Austrians have argued that subjectivism, as a substantive doctrine and as a method, lies at the heart of the unique Austrian contribution. The theory of subjective value as pioneered by Menger, Böhm-Bawerk and Wieser was the first lesson the Austrians taught the economics profession. The subjectivism of value soon expanded into a more general *verstehende* approach in which the actor's problem situation is defined as he⁶ perceives it to be. (This is not to say, of course, that his perceptions bear no relation to an underlying reality.) As Austrian economics increasingly became concerned with the coordinative properties of entrepreneurship and discovery, questions of real time had to surface. Coordination is not simply a matter of meshing activities at a point in time or across a time span frozen by the absence of unexpected change. So the central issue emerged: the meaning of subjectivism in a world of real time.

Subjectivism in time ("dynamic subjectivism") encompasses what Edmund Husserl (1964) called "internal time consciousness" and Henri Bergson called "*la durée réelle*" or real duration (1910, pp. 99–128).⁷ This is consciousness of the passage of time or of the flow of events. As such it requires that consciousness of the present moment manifest within itself a dynamic tendency. Both the past and the future must inhere in that moment through memory and expectation. In the static conception of time the present is a virtual stop – the very negation of passage or flow. In the dynamic conception it is virtual movement from past to future or, more precisely, from memory to expectation. The mnemonic link to the past is responsible for the continuity of the flow. But the flow itself arises out of the contrast between the remembered past and the expected future. Without the novelty of the future (seen as "novel" only in contrast to the remembered past) there could be no sense of temporal passage.⁸ Thus, subjectivism in time or time consciousness entails novelty⁹ and its correlative, ignorance. On the other hand, characterizing time as strictly homogeneous, that is, without novelty, leads to a denial of time consciousness or subjectivism in time.

The denial of time consciousness is inherently self-contradictory from the perspective of the agent. This is because the instantaneous (or mathematical) present is "specious." "Where is it, this present? It has melted in our grasp, fled ere we could touch it, gone in the instant of becoming" (James, 1890, p. 608). We simply cannot perceive a present

apart from memory and anticipation. The perceptible present, on the other hand, “is the vivid fringe of memory tinged with anticipation” (Whitehead, 1961, p. 116). Thus, “[t]here is no sharp distinction either between memory and the present immediacy or between the present immediacy and anticipation” (p. 112). Time consciousness or real duration must be a flow because, without the *continuity* associated with the span of memory to anticipation, there is no temporal perception, no action and hence no subject-matter for economics.

Outside of real time, all that is perceived would appear as if it were at a single instant, including all causes and effects.¹⁰ Since action must presuppose causal efficacy, the simultaneity of cause (i.e., human agency) and effect amounts to a denial of the possibility of action. If every effect we as agents (or causes) desire to bring about has already been brought about, then there is no need or possibility of action. Static models thus contain two concepts implicitly at war with each other: the specious present and action. While self-contradictory models can sometimes be useful (Mises, 1966, p. 236), they are obviously not ideal because any attempt to think through all of their implications can lead us into an intellectual quagmire.

A relatively simple example will show, from another perspective, the incompatibility of the specious present and action. Consider a buyer responding to a fall in the price of an intertemporally substitutable product. Should he purchase more now or should he wait because the fall in price is just a sign of further declines to come? The behavioral implications of a change in the current variable depend on the agent’s expectation of the future value of that variable. This expectation is, in turn, partly dependent on the agent’s previous experience or, more precisely, on his memory of it (Lindahl, 1939, p. 36; Starbuck and Milliken, 1988, p. 40). So the present which has meaning for action is not a specious present, but a present extended to encompass both memory and anticipation.

Austrian economics has become the economics of time and ignorance, not only for “essentialist” reasons such as those discussed above, but also because of its practical attempt, discussed below, to deal with problems of coordination and entrepreneurship. This requires analysis in time, thus implying novelty and ignorance. Given the entrepreneurial turn in Austrian economics (real) time and ignorance *had* to be the next step.

What changes have the ideas of time and ignorance wrought in Austrian economics and in related areas? Before we can answer this question the reader must consider three general points.

First, Austrian economics is still in the process of self-creation so no narrow definition of the subject will capture the significant changes under way. If we were to define Austrian economics so narrowly as to include only the work of those few whose honest vision is fairly restricted, then much of what we say would be untrue about such an Austrian economics.

Second, more importantly, a difficulty in defining Austrian economics narrowly is that it would constitute a stagnant and uninteresting school. It is a consideration such as this, as well as the related capacity for growth in knowledge, that should be paramount in identifying a school. Austrian economics *is* broad because it *needs* to be broad in order to be interesting and in order to grow in the knowledge it conveys. Narrow Austrian economics cannot ask interesting questions and cannot give interesting answers.

Third, in many respects developments in the broader area of subjectivist economics are more important for the future of Austrian economics than those within a narrower range of such thought. This is because gains from intellectual interaction are greatest when, among approaches within the same or similar research programs, there are important differences in perspective. Lawson (1994b, pp. 534–5) suggests, for example, that, substantive differences notwithstanding, Institutionalism, Post Keynesianism and Austrian economics share a common philosophical perspective and “perhaps . . . it is time for some fuller reconciliation between [these] traditions.”¹¹

In the past ten years there have been many important developments in Austrian and related thought. It is impossible to list them all here (and exclusion of some should not necessarily be taken as disapproval), but there are four developments that appear to be fecund and that are closely related to the themes of this book.

(1) *A more profound recognition of the importance of disequilibrating*¹² forces. While most of the older work in Austrian economics certainly did recognize that not all market adjustments are equilibrating, very little emphasis was placed on this recognition and its implications were certainly not explored. It was as if disequilibrium were not an “essential” feature of the market economy: equilibration is essential, while disequilibrium is random or “accidental.” Whatever incentive-driven asymmetries between equilibration and disequilibrium exist (*viz*, agents seek profits and not losses), error is not an accidental feature of a world in real time. The subjective perception of the passage of time inherently or essentially involves genuine surprise. Unless we quite artificially restrict the system to favorable surprises

only, error and disequilibrium will be inevitable and therefore an essential part of market "adjustment."¹³

Today many, if not all, Austrians accept the importance of disequilibrating tendencies in markets (Vaughn, 1994, pp. 139–61; Prychitko, 1993a, pp. 372–4). These tendencies are not simply the result of changes in the exogenous data but emanate from the source of equilibrating behavior, that is, the indeterminate or creative response to perceived profit opportunities. "The same active mental processes which are taken to adjust to change once it has occurred, will also originate change" (High, 1986, p. 115).¹⁴ The very process of adjustment – or rather attempted adjustment – will produce errors that undermine equilibration. If this were not the case and if only systematic equilibrating tendencies existed, then money and, more generally, market institutions would tend to disappear (Boettke, Horwitz and Prychitko, 1994, p. 64). Since data changes would then be the only reason for the continuance of institutions, we should expect them to be relatively unimportant in stationary or traditional societies. In fact, just the opposite is the case.

Israel Kirzner, who for many years resisted acknowledging the importance of disequilibrating tendencies, has now undergone somewhat of a change in thinking, as we shall see farther below. The original exposition of his theory of entrepreneurship is completely spatialized. Profits emerge from the price differentials for a single product in a single market at a single moment in time. "For me the changes the entrepreneur initiates are *always* toward the hypothetical state of equilibrium" (Kirzner 1973, p. 73, emphasis added). Without changes in the underlying data, the long-run movement of the market is toward equilibrium or a state of zero arbitrage differentials. In Kirzner (1982, pp. 153–4) this position is reaffirmed even in an analysis of uncertainty: "It should be clear that nothing essential is lost [in the original model] when our picture of the market is expanded to include many commodities and, in particular, the passage of time." An atemporal market "process" is alleged to be essentially the same as a market process in real time. Such a view is plausible because the adjusting changes are seen to have no impact on the data to which they are adjusting. Thus Kirzner can make the even more amazing claim that it is on the tendency for (presumably constant) opportunities to be noticed that "our belief in a *determinate* market process is founded" (1976b, p. 121, emphasis added). The market process is determinate in the sense that all systematic movements are in the direction of the implicit equilibrium corresponding to the initial data.

In the final analysis, however, this equilibration-always view is untenable. A plausible (albeit moderated) case for it can be made only in circumstances where disequilibrating forces are exogenous in origin. Then we might say that entrepreneurial changes, while not *always* in the direction of equilibrium, tend in that direction – in the sense that, with frozen data, the system may ultimately become consistent with that data. This, however, is not a stable intellectual position. If economics is truly part of a more general humane science of rational choice (“praxeology”) then more and more of the data will continue to be transformed into endogenous “variables”. We have already witnessed the endogenization of technological choice, knowledge of resource availability – as well as the production of resources themselves, tastes defined over market goods, and, of course, the institutional setting itself. If change does not emanate from outside the system (because there is nothing outside), then either (1) there is no change at all, or (2) change is generated entirely from within, and hence equilibrium must be ruptured by endogenous processes. To the extent, therefore, that the equilibration-always view eschews endogenous disruption of coordination, it must degenerate into the complete-stasis position of extreme neoclassical economics. There will be no exogenous shocks to which entrepreneurial adjustments must be made. As a consequence, the task of economics will be quite rightly seen as moving from a framework in which entrepreneurship is important to one in which it is of no (or little) importance. Economics would, in this view, progress only to the extent that it reduces its dependence on the entrepreneurial function.¹⁵

Kirzner has not, to my knowledge, fully understood the difficulty into which he has gotten himself. Nevertheless, he has recently emphasized the impact of erroneous entrepreneurial acts on the process of adjustment (Kirzner, 1992, pp. 31–7). He carefully distinguishes “true” (objective) underlying future realities from “mistake-induced” realities. The former reflect consumer preferences that are uncontaminated by the latter entrepreneurial mistakes along the adjustment path. Consider an example discussed by Kirzner (1992, pp. 29–31). Suppose that the objective situation (the initial data) is that there exists significant unsatisfied demand for shoes. Some entrepreneurs, however, misjudge the data and construct, instead, factories to satisfy the less urgent demand for bicycles. *After these factories are built*, other entrepreneurs sell the additional steel that is needed to make bicycles. Kirzner asks the question: Is the activity of the sellers of steel “coordinating” even though resources should have been used, in the

first instance, to build shoe machinery? His answer is “yes” because the steel entrepreneurs are responding to the data that is currently relevant – the new data involving the mistaken entrepreneurial judgement to build bicycle factories. “The most useful place *now* for the steel is in fact in the bicycle industry. The original realities . . . have no relevance *now*, and have, indeed correctly now failed to influence the allocation of resources” (Kirzner, 1992, p. 30). The original error – the construction of bicycle factories – is the basis for the emergence of profit opportunities that direct resources into the production of bicycles.

As we see it, sometimes errors that occur in the market process are self-reinforcing in a special sense. Entrepreneurial errors along the adjustment path can lead to a cumulative departure away from the equilibrium implicit in the initial data, that is, the data which exists in putative independence of market adjustments. While it may be true that once the first entrepreneurial error is committed, further “errors” relative to the initial data are warranted from a short-run welfare point of view, this is not the central issue here.¹⁶ What is at stake is whether the market, to a greater or lesser extent, generates its own equilibria or, in other words, whether equilibrium is “defined in the process of its emergence” (Buchanan, 1986, p. 73). In Kirzner’s story above, the shoe market will not be moving in the direction of the equilibrium implicit in the initial data. It will, instead, be moving in the direction of an equilibrium that has *endogenously undergone change*.¹⁷ The equilibrium has changed because of entrepreneurial errors in the process of adjusting to the initial data. Thus this example supports, albeit unintentionally, Buchanan’s insight concerning the emergent nature of equilibria.

Despite this recent development in his views, Kirzner does not appear to believe that entrepreneurial errors are a necessary part of processes in real time. One gets the impression that, unlike the coordinating activities of entrepreneurs, errors are just so much happenstance. Moreover, the market process is still portrayed as moving in the direction of *an* equilibrium even if it is not the initial equilibrium. Regardless of where we situate Kirzner in the growing recognition of the importance of disequilibrating forces, many other Austrians have, as we have seen, participated in this intellectual change.

It is sometimes argued that this development has not been salutary because too much emphasis has been placed on disequilibrium and the possibility of disorder. G.L.S Shackle and Ludwig Lachmann, for example, were accused by some of intellectual nihilism. There

is a profound misunderstanding here (for which these authors were partly to blame). In Lachmann's earlier work (1977, pp. 181–93) there was a clear understanding of both equilibrating and disequilibrating forces with an invitation to examine the properties of various markets in terms of the relative strength of these forces.¹⁸ If in later years Lachmann's emphasis (1986) shifted to an examination of disequilibrating forces, the most plausible explanation is that his (largely) Austrian audience needed to hear this far more than another lesson on the equilibrating character of markets. A similar point might be made about Shackle since his intended audience was the (neoclassical) profession-at-large which needed the disequilibrium lesson even more than the Austrians needed it.¹⁹

The ultimate significance of this more profound recognition of the importance of disequilibrating forces is an increasing focus on the conditions necessary for equilibrating behavior, and, ultimately, on the different senses of equilibrium.

(2) *Greater attention to the prerequisites for equilibrating behavior.* If equilibration cannot simply be taken for granted, in the sense that profit opportunities – in and of themselves – are sufficient to ensure movements toward equilibrium, then it is necessary to discover the cooperating conditions that are needed to make equilibration more (or less) likely. But before this can be done we must understand that different concepts of equilibrium have different knowledge requirements. These requirements differ not only in the content but also in their severity, and therefore in the likelihood that an economic system will move in the direction of the equilibrium described by the concept. The more complex the knowledge requirements in equilibrium the more complex the knowledge requirements of successful moves toward that equilibrium.

At one end of the “continuum” the concept of individual equilibrium, without common knowledge across individuals, is almost a tautology. (The qualifier “almost” is used because under conditions of uncertainty there is an entrepreneurial element in discovering the most efficient means to ends.) Maintenance of such an individual equilibrium over time, requires that the data generated by the economy does not disrupt the agent's expectations. In the absence of common factual knowledge, agents can have their individual expectations confirmed while holding incompatible theories.

Interpersonal equilibria, on the other hand, have more stringent knowledge requirements. Market-day coordination on the stock market, for example, requires knowledge of offers to buy and offers to sell. Yet

there are, and indeed must be, divergent expectations about the future value of the stock. Mutual compatibility of individual plans *over time* requires convergent expectations among those who are engaged in exchange (otherwise their plans would be based on inconsistent premises). Finally, a *full* plan coordination not only requires mutual compatibility of plans of exchanging agents but also the complete exhaustion of gains from trade. The prerequisites for equilibration will thus vary in content and likelihood depending on the concept of equilibrium in use. A detailed examination of these is beyond the scope of this Introduction. Our attention shall be largely focused, therefore, on the more general considerations common to a wide variety of equilibrium concepts.

Some of the conditions prerequisite to equilibration can be analyzed at the aggregate level while others are more obviously and fruitfully analyzed at the individual level. At the aggregate level, we can think of institutions as “points of orientation” (Lachmann, 1971, p. 38) that are likely to lead to relatively compatible actions and expectations. At the individual level, we can assess the information requirements for increased coordination (e.g., Hayek’s “knowledge of the particular circumstances of time and place” (1948b, p. 80)). The former consists of general or enduring pieces of knowledge, while the latter consists of knowledge relevant for so short a time-period that it cannot have been congealed into institutions.

In a number of articles Peter Boettke (1990a, b; 1994) explores the epistemic properties of alternative institutional arrangements. Institutions are, in an important sense, congealed social knowledge. By following institutionally-sanctioned patterns of behavior, separate individuals are able to coordinate more completely their actions and plans. This is because institutions often limit the options available to an individual thereby reducing the uncertainty about what others are going to do. Furthermore, to the extent that institutions represent approximate, if not optimal, adaptations to the objective environment, the individual plans will also be roughly coordinated with that environment.

On the other hand, institutions which encourage what we call (in chapter 5) “time-dependent uncertainty” can be discoordinating. Suppose speculator *A* expects speculator *B* to place a high valuation on an asset (e.g., the stock of a firm) but neither of them has any idea about how much consumers will indirectly value the firm. It is quite possible that the underlying institutional arrangement, that is, the stock market, will generate a great deal of uncertainty as people try

to guess what others are thinking about their thoughts (and so forth). If, however, the speculators are really trying to guess what others are concluding about the current and future decisions of *consumers* and there are some shared beliefs about these, then institutions may decrease, rather than increase, uncertainty. This is because knowledge or knowledge surrogates are disseminated more quickly when price offers and actual transactions are made manifest in an organized setting.

Institutions are also less likely to enhance coordination in the context of "big players." In a series of papers Koppl and coauthors (Koppl and Yeager, 1994; Butos and Koppl, 1993; Koppl and Langlois, 1994) have argued that the presence of agents who are large and relatively less sensitive to the discipline of profit and loss reduce the reliability of expectations. There are at least two reasons for this. First, the mass of agents must try to predict the idiosyncracies of a single individual (e.g., the timing of short-term interest rate recommendations by the chairman of the Federal Reserve Board). Second, the behavior of big players is more likely to be suboptimal or maladapted than that of players who are more strictly subject to the discipline of profit and loss. Consider, for example, the dubious behavior of a central banker seeking to keep the international value of his currency from falling in the face of accelerating domestic inflation. Furthermore, to the extent that governments try to insulate agents against the possibility of failure, then they can create a big-player effect through relatively small players. Such is the consequence of Federal deposit insurance on the stability of the banking structure. Under this system of "insurance" risk is shifted by the big players (the Federal Deposit Insurance Corporation) from the banks who create it to depositors. This means that the banks will incur more risk than is appropriate and the banking system will become more unstable than otherwise (Clair and O'Driscoll, 1993, pp. 47–8). This instability is ultimately a result of the institution-creating behavior of the big players.

Within a given institutional context, equilibration requires the dissemination and utilization of transient knowledge. The knowledge-enhancing movements that can occur in disequilibrium contexts vary in their complexity and difficulty. The nearer the system is to overall equilibrium, the fewer are the deviations of prices, quantities and expectations from their "appropriate" magnitudes (or the smaller are such deviations). Under these circumstances, individual agents are more likely to make correct or equilibrating decisions. The farther the

system is from overall equilibrium, on the other hand, the more complex is the system of deviations from appropriate magnitudes and hence the more likely agents are to err in their adjustments (Rizzo, 1990, p. 25).²⁰

It might appear that in far-from-equilibrium situations there will be larger profit incentives to overcome – perhaps completely – the greater information difficulties. If this were true it would not follow (except *ceteris paribus*) that equilibration is less likely far from equilibrium. Information difficulties, however, are not perfectly offset by the greater potential profits. The distance from equilibrium to which we are referring is not primarily that of a single price deviating from its equilibrium value. Instead, we are referring to a situation of many markets in states of disequilibrium. In such a circumstance there will be complex distortions among these many markets. To obtain the large profits associated with significant moves toward equilibrium a number of prices must be changed simultaneously. Even if there were to happen, however, a single decision-maker would not be able to appropriate these large profits. He would earn the smaller profits associated with the movement of a single price because related prices would be beyond his reach.²¹

(3) *Growing attention to the idea of endogenously-produced change.*²² The essence of the contemporary Austrian research program (or, more precisely, of its positive heuristic) is the development of the idea of endogenously-produced change. This lies at the heart of the “genetic-causal tradition” (Cowan and Rizzo, 1995) in economic thought which, although certainly not confined to Austrian work, received its most self-conscious elaboration by Austrians, especially by the neglected Hans Mayer (1994). Schumpeter (1934, p. 63) was also one of the first to lay explicit stress on the concept of endogenous change, but failed to convince the economic profession as a whole of its importance. A careful examination of the nature and role of “entrepreneurial alertness” in contemporary Austrian theory will show that only by elaborating the idea of endogenously-produced change can Austrians be successful in drawing out the full implications of their contribution and in differentiating their product from that of the neo-classical mainstream. Alertness, that is, the discovery propensity, although exogenous in certain respects, is switched on by profit opportunities within the economic system. Nevertheless, the way in which alert entrepreneurs move from knowledge of the current state of the world to knowledge of future opportunities is largely unexplored. Austrians must show, obviously in general terms, first, how knowledge

is disseminated within a disequilibrium economy and, second, how the economic process itself generates completely new knowledge. Both the dissemination of knowledge (“subjective novelty”) and the generation of completely new knowledge (“objective novelty”) are sources of change within an economy (Witt, 1992, pp. 223–4).²³ While the first issue is extremely important, our main concern was and is with the second.

Brian Loasby’s emphasis on research programs, discussed below, and elaborated recently (1991), is an important step in the direction of understanding the generation of new knowledge. Still more recently, David Harper (1994, 1996) has comprehensively applied the broad Popperian framework to the phenomenon of entrepreneurship. Among many interesting results, Harper shows that since the solution to any given problem necessarily gives rise to new problems, entrepreneurial learning can never cease or settle into a state of rest. Thus, not only will knowledge continually grow but it will grow in a coherent way arising out of the previous problem situation (or, at least, so it would seem most of the time). Attempts to solve current problems, *whether successful or not*, will give rise to new problems and thence to new knowledge. The history of technological change is replete with examples of this phenomenon (Rosenberg, 1969).

There is also an older tradition, to which Loasby (1991, pp. 11–12) refers us, that holds promise for understanding endogenous change. This is the idea of dynamic increasing returns in its original Smithian version. Unlike the more recent version of Brian Arthur (e.g., 1990) changes in technology are not the result of random shocks at some early stage of technological development. In Adam Smith’s version the specialization and concomitant division of labor directs the individual’s attention to certain problems and hence to certain kinds of solutions. These problems are actually opportunities for increased productive efficiency which intimate knowledge of the productive process (through division of labor and specialization) gives rise. There is nothing automatic about this growth of knowledge. What the (static) division of labor does is make the perception of some technological opportunity for gain (“the problem”) more likely and by increasing the agent’s understanding of possible technologies renders the solution more likely.

More importantly, it is not only the division of labor, *having already occurred*, that endogenously generates the production of new knowledge. In a world of real time and novelty, the division of labor is not simply a function of the (exogenous) size of the market. Greater

division of labor – and hence improvements in technology via Smithian increasing returns – does not need to be generated by an exogenous shock. In real time the homogeneous differentiates into heterogeneity spontaneously.²⁴ So relatively unspecialized and undivided labor (the homogeneous) becomes more and more specialized and divided (the differentiated heterogeneity) as productive knowledge grows in the passage of time. As a result there will also be continual growth in the technologies inspired by the ever-new divisions and specializations of labor. This is an application of the Principle of the Instability of the Homogeneous. As earlier discussed by Herbert Spencer (1888, pp. 401–2), it did require initiation by an exogenous shock, but in more modern discussions by complexity theorists it became a principle of spontaneous differentiation (Prigogine and Stengers, 1984, p. 38). Thus any *given* division of labor with its consequent opportunities for the growth of knowledge will not simply play itself out and settle in an equilibrium. It will continually generate new divisions of labor which will, in turn, produce ever-fresh discoveries. This is a reason that overall equilibrium is inherently unstable in the long run. Equilibrium makes possible the very circumstances (i.e., divided labor and specialization)²⁵ that generate a change in knowledge and hence an undoing of the equilibrium. Spencer's law, cited above, is actually the Principle of the Instability of Equilibrium.²⁶

(4) *Attention to the reconciliation of equilibrium and unpredictable change.* An economics *in* time must have an equilibrium construct that is in time as well. Hayek tried to marry equilibrium and time. As we show in chapter 5, however, the conception of time was, in his earlier work, largely static. As such, Hayek's first "marriage" was not a happy one; it does not carry us very far along the contemporary Austrian research program. In Hayek's later work (1973, pp. 98–110; 1976, pp. 114–25) the reconciliation among equilibrium, time and unpredictable change is more successful. Hayek distinguishes between the legal framework, upon which the relative certainty of expectations is founded, and the system of market exchanges within that framework, in which there is no certainty of expectations. Because of the law's abstract quality, agents can rely on expectations regarding the typical form or pattern of economic interactions (Rizzo, 1985; Horwitz, 1992, pp. 45–79). In contract law, for example, there are criteria for a valid contract regardless of the price or nature of the goods exchanged; excuses or justifications for breach of contract do not depend on the prices or quantities of economic theory – and neither does the type of remedies for breach. There is a relative order

or “pattern equilibrium” at the level of legal institutions. Within this higher-level equilibrium, however, there is a disequilibrium or continual change in the economic variables. The framework clearly permits agents to change their plans (and hence the prices of whatever they buy or sell) in accordance with new facts about both the external world and other agents. In fact, the stable legal framework makes such change *possible* for without the certainty generated by the institutions of property and contract market exchanges would cease. In facilitating these changes the higher-level pattern equilibrium ensures maximum market coordination. Maximum coordination, however, does not necessarily mean a state that is fairly close to a full or exact coordination (Rizzo, 1990, pp. 25–7). This is because to attain the highest possible degree of coordination we must have (adaptive) change which itself involves a certain amount of discoordination. The very process of coordinating must involve discoordinating. Thus encompassed within an overall pattern equilibrium there is a system of market interactions that endogenously produces a certain degree of disequilibrium – a disequilibrium that is vital to generating whatever degree of market coordination we do in fact enjoy. If we move beyond simple adaptation to the case of technological change, it is clear that an initial change will stimulate still-further technological discoveries and consequently disappointments in expectations. This is because technological changes generate imbalances and bottlenecks in production processes (Rosenberg, 1969, pp. 1–11). These, in turn, create profit opportunities where there were none previously, in associated technologies, as well as disappointments in the expectations of those whose activities were coordinated with the old technology. These effects are discoordinating in terms of the current *behavior* of agents, whatever the long-run consequences for the satisfaction of their underlying preferences.

Another promising, if yet untested, route has been forged by Brian Loasby (1991). He wishes to adapt the concept of equilibrium to the continual process of learning that occurs under conditions of real time and radical uncertainty. For Loasby an equilibrium is something similar to a shared research program, that is, an intellectual structure for learning.²⁷ A research program contains, among other things, instructions as to how individuals ought or ought not to go about learning. Although the structure is temporarily fixed and relatively predictable, what individuals will learn when applying it is not fixed or predictable. Genuine novelty is not thereby excluded from equilibrium in real time. The most obvious locus for a “fixed” research

program is the individual firm, regulated, as it is, by a single or small group of decision-makers. Nevertheless, it is not inconceivable that, at least with respect to general or broad features of the environment, a common and relatively fixed research program may apply across many individuals and firms within an economy.²⁸

An equilibrium construct in time has significant implications for the equilibrating process. To the extent that equilibrium can “realistically” be defined only in terms of relatively constant structures of a higher order (e.g., law, research programs) the transmission of knowledge during periods of equilibration must be conceptualized in a radically different way. It no longer makes sense to think of this knowledge as decentralized *facts* about consumer demand, resource availability, etc. This would be more appropriate to a static framework in which knowledge of current facts moves through a system. What kind of knowledge can be transmitted through a system undergoing change? To transmit the data of today is already too late because decisions are future-oriented. In a world of real time, and hence of change, the facts of yesterday or today will not be the same as those of tomorrow. An efficient economic system must therefore transmit not (outdated) facts but effective techniques of coping with change, of solving problems of a certain type.²⁹ “Evolution selects, therefore, for populations with the ability to learn, rather than populations with optimal, but fixed, behavior” (Allen, 1994, p. 11). This is why “institutions” at the individual or firm levels (routines), as well as at the more general societal level, are very important. At their best, institutions are successful methods of dealing with an unknown future.

The evolution of money made possible the rapid adaptation of the individual's and community's resources to new conditions. The firm-routine of maintaining inventories performs a similar function in a more specific way. Other institutions provide adaptational flexibility, not so much by improving responses once a change is recognized, but by improving recognition or anticipation of change in the first place. While the future is not predictable it is also not entirely novel or undetermined. There are repeated patterns (typicalities) in the world which make certain routines of problem-solving successful even where the content of the problem could not have been predicted beforehand. It is also true, however, that the future is *partially* determined by antecedent conditions. Thus, attention to the “laws” of our world puts us in a better position than we would otherwise be to anticipate at least certain aspects of future developments. The insti-

tutionalized methods or techniques of accomplishing all this are vital to the successful functioning of an economic system.

Markets transmit propensities to adapt and to learn through the incentives provided by profit and loss. It is obvious that the kind of “knowledge” to which we are now referring cannot be summarized in a price. Nevertheless, a price system, through the discipline it exerts on actors, can stimulate them to do much to adapt to and partially anticipate the future.

Even after ten years, *The Economics of Time and Ignorance* must be seen as a transitional work. Between the late twentieth-century Austrian revival and the new mature Austrian economics of the twenty-first century must stand an intellectual transition: a series of insights, problems, incomplete and perhaps even messy solutions. We make no pretence that our work is anything more than a small beginning but, we deeply believe, a step that must be taken in order to enter the world of discovery that could be ours.

NOTES

- 1 I am indebted to many people, for very helpful comments on earlier drafts, particularly to Gerald P. O’Driscoll, Jr. and Peter J. Boettke. I am also indebted to William Butos, Young Back Choi, Robin Cowan, Andres Garcia, Sanford Ikeda, Israel Kirzner, Roger Koppl, David Harper, Yaw Nyarko, Joseph Salerno, Karen Vaughn, and the Austrian Economics Colloquium at New York University. Responsibility for errors is mine alone.
- 2 The idea of asking innovative questions is in the Hayekian tradition. See O’Driscoll (1989, p. 345).
- 3 There has been a world-wide explosion of work in the broad subjectivist tradition, some of which has appeared in the *Review of Political Economy* (Edward Arnold), *Advances in Austrian Economics* (JAI Press), *Review of Austrian Economics* (Kluwer Academic Press), the series of books entitled, “Foundations of the Market Economy,” published by Routledge, and the series of books entitled, “The Political Economy of the Austrian School,” published by New York University Press. Attention should also be directed toward the “praxeology” school reflected in the sociological journal, *Cultural Dynamics* (E.J. Brill). Moreover, Austrian perspectives in macroeconomics are now receiving recognition side-by-side with mainstream developments. See, for example, Snowden, Vane, and Wynarczyk (1994). Other related intellectual currents are emanating from work on realism in economic thought severally produced by Lawson (1994a, c) and Mäki (1990). There is also a lively Austrian-inspired literature on competitive

banking in the works of White (1989), Selgin (1988), Selgin and White (1994), and Cowen and Kroszner (1994). Similarly, an Austrian (i.e., Böhm-Bawerkian) literature on capital theory has been produced by Faber (1986). In the field of comparative economic systems there is Lavoie (1985), Boettke (1990c, 1993), Prychitko (1991) and Kornai (1992). Evolutionary economics has witnessed attempts to combine Austrian with other strains of thought in the work of Langlois (1992) and Witt (1992). One cannot fail to mention, as well, the international industry devoted to the analysis and criticism of the work of Friedrich A. Hayek. The contributions to this literature are vast. Mention should be made, however, of Birner and van Zijp (1994) and Colonna and Hagemann (1994a, b).

- 4 In recent years, the theme of economics patterned-after-physics has been examined critically by Philip Mirowski (1989).
- 5 Although fashionable, a very sharp division between philosophy and science is insupportable. Philosophy is more "scientific" than is commonly supposed, and science is more "philosophical". See Gjertsen (1989). For a discussion of realism in economics, see Mäki (1990).
- 6 "He" is used in its traditional generic sense. Readers who are uncomfortable with this may mentally replace "he" or "his" with "it" or "its" because the actors, agents or individuals discussed are constructs rather than flesh-and-blood people.
- 7 We are quite aware that there are important differences on the conception of time among Husserl, Bergson, James and Whitehead (the latter two are cited below). For our purposes these differences are not important. We are making use of the characteristics these ideas have in common to illuminate issues in economics; this is not a detailed work in philosophy. On differences among Bergson, James, and Whitehead, see Capek (1971: *passim*).
- 8 In ordinary parlance we reserve the word "novel" for differences that are relatively large or interesting. The change that is a necessary part of our perception of time's flow may be boring. This is, in part, responsible for the mistaken view that it is possible for real time to flow without anything new happening.
- 9 Cycles may or may not qualify as novel. If agents think and make decisions at the level of the putatively identical cycles, then there is no novelty and hence no time consciousness. If, on the other hand, the cycle is a phenomenon visible only to the analyst, then the agents may experience change within the cycle. For these agents there is novelty and hence time consciousness.
- 10 The reader ought to keep in mind that we are talking about time *consciousness*, and not physical time.
- 11 Lawson locates the common perspective at a fairly high level of abstraction in the philosophical tradition of "transcendental realism." This set of ideas holds, *inter alia*, that (1) the world is "structured," that is, not reducible to the events of sense experience, and (2) these structures are "intransitive,"

that is, they exist independently of their identification (Lawson, 1994, p. 513). Burczak (1994, pp. 31–58), on the other hand, discovers a common thread between Hayekian Austrianism and Post Keynesianism in their “postmodern moments.” The emphasis here is on “constituted subjectivity” or, more specifically, on the way in which socially-constituted knowledge and meaning affect human action (pp. 34–6). These two conceptions of a common perspective do not appear, at least *prima facie*, to be entirely consistent.

- 12 “Disequilibrating” refers to a movement away from equilibrium. There are different meanings of the term “equilibrium” in modern Austrian economics. The meaning in this subsection is that of full coordination of plans, i.e., (1) the mutual consistency or compatibility of plans (ex ante and ex post) among agents who are trading with each other; and (2) the exhaustion of profit – arbitrage – opportunities. Thus, even if Jones (seller) and Smith (buyer) are both happy to trade apples at 25 cents each, this is not an equilibrium if Wilson would be willing to buy from Jones at 35 cents each. An equilibrium in this sense is not equivalent simply to maximizing behavior. Furthermore, equilibrium requires more than that the interacting parties have consistent beliefs. There must also be a dissemination of knowledge to all parties to whom it would be relevant.
- 13 If favorable surprises have implications for action (rather than are simply windfalls) then, as surprises, they will cause disruption of the plans of others, and hence a certain amount of disequilibrium. For a view that excludes favorable surprises from the process of equilibration, see Fisher (1983, pp. 86–94) and the analysis of Fisher by Ikeda (1990, pp. 81–4). Consider also, at this point, the statement by Joan Robinson (1971, p. 53): “[I]t is impossible for a system to *get into* a position of equilibrium, for the very nature of equilibrium is that the system is already in it, and has been in it for a certain length of past time.” The very factors responsible for the existing state of disequilibrium may make movement into a position of full equilibrium impossible.
- 14 Compare Franklin Fisher (1983, p. 91): “In an ongoing economy, what constitutes an ‘exogenous’ shock? How is such an original shock to be distinguished from the ‘endogenous’ shock brought about by adjustment to the original shock?”
- 15 For an interesting discussion of the disappearance of the entrepreneur from neoclassical economics, see Barreto (1989).
- 16 To the extent that the relevant short-run equilibrium is defined largely by mistake-induced “data,” then Kirzner’s implicit welfare standard is not independent of the analytical standard around which he organizes his description of the market process. This “merger” raises profound questions beyond the scope of our inquiry here. Furthermore, from a long-run perspective the accumulation of many errors along the adjustment path should cause us to revise our conception of the welfare properties of the market to one which is primarily based on the comparison of institutions. For the

- original statement of the comparative-institutions approach, see Hayek (1948a, p. 100, 105–6).
- 17 Vaughn's failure to recognize the importance of this endogenous shift in equilibrium leads her to say that Kirzner has not changed his position (Vaughn, 1994, p. 149).
 - 18 It is instructive to compare Kirzner's more recent approach (1992) with that of Lachmann (1977). Consider, first, Kirzner (1992, p. 35): "Although theory insists on the formal validity of the market coordinating process under all relevant circumstances, it does not claim that the tendencies which make up the process operate with uniform power at all times and in all contexts. It is easy to imagine circumstances where the power of the coordinative market process is completely swamped by the volatility of change and by the high incidence of entrepreneurial error. No doubt there have been moments in capitalist history where this has been the case." The reader should now decide to what extent Lachmann (1977, pp. 189–90) is saying much the same thing "[T]o deny the significance of general equilibrium is not to deny the existence of equilibrating forces. It is merely to demand that we must not lose sight of the forces of disequilibrium and make a comprehensive assessment of all the forces operating in the light of our general knowledge about the formation and dissemination of human knowledge."
 - 19 I am more confident of my understanding of Lachmann's position than of Shackle's. I discussed these issues with Lachmann over a period of many years. Nevertheless, those who believe that Shackle sees no order in economic affairs should read Shackle (1969, pp. 4–5).
 - 20 Any attempt to make the concepts of "nearer" to or "farther" from equilibrium precise is fraught with difficulty. Nevertheless, it seems (intuitively) that there is an important analogy here with the behavior of physical systems whose equilibration properties vary with their distance from equilibrium.
 - 21 The ideas in the preceding two paragraphs bear an obvious relationship to Leijonhufud's concept of the "corridor" (1981, pp. 109–10). Within the corridor, that is, when the economy is near overall equilibrium, deviations bring the system back to equilibrium; outside of the corridor (i.e., far from equilibrium) they move the system farther away.
 - 22 In this section we pay exclusive attention to endogenous change on unhampered markets. On the other hand, Sanford Ikeda (forthcoming) has developed this idea in the context of state intervention in the economy. He shows how endogenous change can propel a system from the minimal state to a highly-interventionist state.
 - 23 The distinction between subjective and objective novelty is important because the first involves pure dissemination and thus can be modelled by the economist in a way that permits a neat separation between the endogenous and exogenous. The to-be-disseminated knowledge can be viewed as given to the analyst (if not to the agents). Its dissemination amounts to discovery of the system's data and thus is modelled as equilibrating. On the

other hand, completely new knowledge cannot be taken as given even to the analyst and should be modelled as disruptive of equilibrium.

- 24 “Spontaneously” does not mean in a completely undetermined manner. Instead it means *underdetermined*, that is, the determinants of a particular event do not necessitate its production.
- 25 A system in overall equilibrium encourages greater division of labor and specialization than a system outside of equilibrium. This is because the division of labor, which makes greater production possible, is limited by the extent of the market. The market has a greater “extent” the more often traders can rely on selling their greater output and the more frequently consumers can buy from the market. Thus the extent of the market varies directly with the degree of coordination among market participants or inversely with the distance from overall equilibrium. See Loasby (1991, pp. 9–13).
- 26 “Order is desirable not for keeping everything in place but for generating new powers that would otherwise not exist” (Hayek, 1988, p. 79).
- 27 Young Choi Back (1993) has similarly modelled equilibrium as a “regime of convention” (p. 99) which in turn is based on a paradigmatic learning structure.
- 28 This, however, is just speculation at this stage of our endeavor. Much more work will be necessary to test this idea. Nevertheless, see the stimulating observations and analysis of Denzau and North (1994).
- 29 Nathan Rosenberg (1969, p. 1) observed this phenomenon in his study of the inducements to technological progress: “One of the things which is perfectly obvious about societies which have achieved high degrees of industrialization is that they have acquired unusual skills in problem-solving activities.”