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# Man as Machine: The Plight of 20<sup>th</sup> Century Economics

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## I Introduction

The great Austrian economist Ludwig von Mises tried to capture the differences between the natural and human sciences with the following quip: “You throw a rock in water, it sinks; throw a stick in water, it floats; but throw a man into water, and he must *decide* to sink or swim.” Mises was not denying the scientific nature of economics with this tale of human volition. Rather, he was attempting to get across to his audience the essential defining character of the human sciences — we study man with his purposes and plans. As Fritz Machlup (1978) once put it, economics is like the physical sciences to the extent that matter can talk.

Unfortunately, economics in the 20<sup>th</sup> century proceeded as though it didn’t matter that the central focus of the subject was human actors. Wasn’t it true that the physical sciences progressed when purposes and plans were stricken from the analysis? Lightening was not due to the anger of the gods, but was a result of physical properties. The purging of anthropomorphism was appropriate in the physical sciences. But the purging of man from the human sciences results in the abolition of its subject matter. The human element is eliminated and replaced with an a utility machine. Economics developed a theory of

the machine economy, but lost complete sight of the human economy.

The machine economy has two features that added to its attractiveness to scholars suffering from an inferiority complex in relation to the natural sciences. It permitted explicit modeling in a way that human volition denies, and it encouraged calibrated measurement of aggregate effects. Model and measure were the hallmarks of science and machine economics enabled economists to pursue modeling and measuring without reservation. Of course, some economists resisted these steps — perhaps none as vociferously as the Austrian economists Mises and Hayek.<sup>1</sup> But the critics were for the most part silenced. In this paper, we hope to highlight the path that economic theory took in the 20<sup>th</sup> century as a result of purging man, and then suggest ways to bring man back to the center of economic analysis.

It is our contention that the movement in economic thinking is composed of four competing visions. Furthermore, we contend that only one of these visions is compatible with an understanding of economics that both recognizes the universal nature of economic truths and makes humanity the alpha and the omega of economic thinking. This vision, our first, belongs to the predominantly verbal economic analysis of Adam Smith, New Insti-

tutional Economics, and the Austrian tradition, which emphasizes the centrality of acting man in its study and maintains the universal nature of economic propositions. The second vision is that of Historicism and Old Institutionalism. Here, while the mode of expression is verbal and the place of human actors prominent, it is believed that economic truths revealed through study are merely *particular* truths, wholly specific to time and place. The third vision belongs to the neoclassicism of 20<sup>th</sup> century economics. The human element is virtually purged from the analysis and in its place *homo economicus*, the cyborg-like optimizer, is substituted. Because acting man is conspicuously absent from this vision and the understanding about what constitutes economic truth shifts from understanding man to generating predictive power, the mode of exposition is purely a formal one of mathematical modeling and statistical testing. Though man may be missing, because of the perceived belief in a unique equilibrium, determinism makes possible economic laws universal in nature. Finally, the fourth vision presents a sort of hybrid between the previous two strands of thought. In the wake of the Folk Theorem and the notion of multiple equilibria, this vision maintains the formal analysis of our third vision but discards the

notion that economic truths are necessarily universal truths. In this vision, as in the third, robotic reaction dominates the analysis and acting man is relegated to the sidelines. The four visions outlined above and their relationships to one another are presented below in Figure 1.

## II The Primacy of Man

For Smith and his contemporaries, acting man was at the center of economic study. This is partly the result of their concern with what they understood to be the moral relevance of exchange activities, which they viewed as inextricably linked to an understanding of market behavior. Nonetheless, this emphasis on man as the ultimate subject matter of economics was borne out of an appreciation that all economic activity is ultimately the activity of fallible, creative, and choosing actors. For economists of Smith's age, economic truth was to be found in exploring the motivations and outcomes, both intended and unintended, of human action. Owing to this emphasis on the uniquely human element of economics, economic truths, Smith and his cohorts believed, were necessarily universal in nature. Some nations were rich while others were poor not because of unique geography, relative abundance of resources, or serendipity of historical time, but because some nations pursued policies of easy taxes, a fair administration of justice, and a private property order conducive to wealth while others did not.<sup>2)</sup> In the eyes of someone like Smith, this was as true for England as it was for Africa. Furthermore, the mode of expressing these truths was a verbal one. Although the technologies of modern mathematical and statistical modeling were largely unavailable to economists of the 18<sup>th</sup> and 19<sup>th</sup> centuries, from the writings

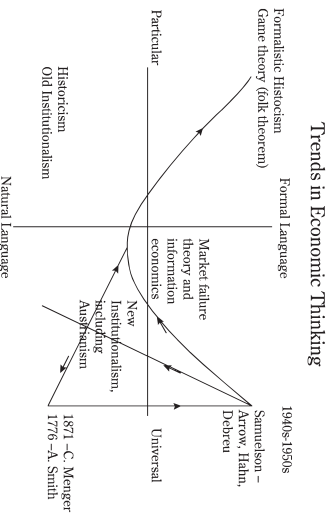


Figure 1 Trends in Economic Thinking

of Smith we can infer that this ‘constraint’ was really no constraint at all. His focus on the dynamic nature of man and market activities was in his mind both best expressed and understood in plain language. Thus, it is not at all apparent that, had the formal tools available to economists today been available to Smith and his contemporaries, that they would have actually employed them.<sup>31</sup>

The 19<sup>th</sup> century in economic thought saw the rise of historicism, particularly as manifested in the economics of the German Historical School. Although these economists, like Sombart or Schmoller, put the human element at the center of economic study and consequently employed verbal methods of analysis, for them the notion of universal economic truths was chimerical. The ‘economic laws’ effective in Germany in the 19<sup>th</sup> century were precisely that—truths specific to the people of 19<sup>th</sup> century Germany. Old institutional economics later emerged with a similar approach to the study of economics. Man was central to the analysis but the universality of economic truths was not.

Contra historicism, economists in the tradition of the Austrian School such as Carl Menger (1871), Ludwig von Mises (1949) and F.A. Hayek (1948), emphasized the primacy of man in the vein of Adam Smith. As Menger argued, “man, with his needs and his command of the means to satisfy them, is himself the point at which human economic life both begins and ends” ([1871] 1981, 108). The economist, *qua* man, is the subject of his own study. In this sense the human sciences possess an advantage over the physical sciences. Because of this unique position, the human sciences are able to know the ultimate cause of phenomena—man the chooser.<sup>32</sup> This enables the sciences of human action to

pursue the logic of cause and effect. As Hayek stated: “We thus always supplement what we actually see of another person’s action by projecting into that person a system of classification of objects which we know, not from observing other people, but because it is in terms of these classes that we think ourselves” ([1948] 1980, 63). For the Austrians, precisely what makes economics different from other sciences is that it deals with purposeful actors. The importance of time, uncertainty, and learning are all emphasized, as these are the conditions necessary for human choice, and with which real world man must constantly cope. To ignore these issues or move them to the background of economic analysis is to purge the peculiarly human element that economics must concern itself with. The world confronts man with unceasing change. There is nothing static or neat about man’s attempts to realize his ends. While comparative statics may provide a useful model for explaining some observed behavior, at its root, static analysis ignores the dynamic processes that are inextricably linked to man’s attempts to better his position. This recognition of the importance of processes as characterizing the economic world of real human actors further highlights the centrality of conscious, purposive agents in the Austrian framework. In a world of dynamic change, something must be driving the movements—an understanding of the market as a process requires a creator of change. This generator of change is the creative imagination of the entrepreneur, who in his attempt to earn profits and avoid losses, drives the market process. Thus at the foundation of the Austrian approach is the entrepreneurial element in human action.<sup>33</sup> As Mises points out, “This function is not the particular feature of a particular special

group or class of men ; it is inherent in every action and burdens every actor...The term entrepreneur...means : acting man exclusively seen from the aspect of the uncertainty inherent in every action” (1949, 252-3).

Economic decision makers do not simply react to given data and allocate their scarce means to realize given ends. The entrepreneurial element in human action entails the discovery of new data and information ; discovering anew each day not only the appropriate means, but the ends that are to be pursued (Kirzner 1973, 30-87). Moreover, the ability to spot changes in information is not limited to a selective group of agents — all agents possess the capacity to do so. Entrepreneurial discoveries are realizations of ex post errors made by market participants which either caused them to be, ex ante, over or under pessimistic in their expectations. The existence of error provides scope for profit opportunities that actors can realize if they move in a direction less erroneous than before.

The Austrian appreciation of the primacy of man in economic analysis does not dampen the universality of economic truths. However, given the complexity of the human predicament, natural language is far better suited than formalism for conveying these truths. Although the particular ends sought and means employed vary among people, places and time, purposeful behavior in the most general sense is itself an omnipresent feature of the world. Thus, although the applicability of particular laws of economics derived from the starting point of human action will vary from place to place, their truth-value is universal. The universality of purposeful human behavior begets the universality of the economic truths that explain this behavior. Economics can explain the ten-

dencies and direction of change, even if it cannot explicitly model or measure the statistical significance of change.

### III Purging the Human Element : The Rise of Neoclassicism<sup>6)</sup>

As the 20<sup>th</sup> century progressed, the idea that economics should strive for quantitative laws and predictive capacity gained hold. This was partly a result of an increasing number of mathematical and statistical tools that appeared to make this possible. And certainly as the sophistication of computing technology grew and its cost fell, more economists made use of these tools in their analyses. The idea took hold in economic thinking that economic truth could best be discovered via the quantitative approach of the natural sciences. To be sure, with the aid of mathematics, the natural sciences had succeeded in progressing at a rate much faster than its sister social sciences. Thus it is not altogether impossible to understand why many in the economics profession looked to the method and approach of the hard sciences as a guide.

Neoclassical economists took the opportunity to increasingly introduce formalistic tools from the natural sciences to economics. On a theoretical front, the crowning achievement of this effort was the development of general equilibrium theory, formalized by Arrow, Hahn and Debreu. These economists and their cohorts articulated the mathematical conditions under which a deterministic equilibrium for the entire economy would hold. By solving a complex system of simultaneous equations, they were able to describe a general equilibrium. In the wake of this achievement, the well-known first and second theorems of welfare economics were also forged. This in turn led economists like

Samuelson and others to create the notion of a social welfare function and with it the field of modern welfare economics. Neoclassical economists made no bones about the universality of general equilibrium, the first and second welfare theorems, or the implications of the burgeoning field of welfare economics. For the most part, these ‘economic truths’ were mathematical ones — thus, the question of their universality was really no question at all. Economic laws derived this way have as much universality as the mathematical truths that compose them.

Much of this ‘scientific progress’ in neoclassical economics, however, came at a price. More specifically, the human element became less and less central to the neoclassical conception of economic activity. In the general equilibrium framework, for instance, where there are an infinite number of agents all of whom are price takers, who changes the price to enable the market to clear? The answer of neoclassical economists is the fictional ‘Walrasian auctioneer.’ But this answer misses the crux of our simple question. The fictional ‘Walrasian auctioneer’ is fictional. He certainly has no counterpart in the real world of acting man, so how does general equilibrium analysis enable us to better understand the real world of real men? In the real world, market participants actively pursuing their interests make price offers and refusals, the interaction of which ultimately generates the market-clearing price. This process takes place in time and is highly imperfect. Where though do time and imperfection play a role in general equilibrium analysis?

Similarly, in the general equilibrium world, the fictional ‘Walrasian auctioneer’ does not permit any false trading, but this is clearly not the case in the real world. The real world

is populated by ignorant actors who face uncertainty and make mistakes. This feature of markets made possible by human actors is critical to an understanding of the actual market process, but remains absent in the general equilibrium framework. In general equilibrium analysis, it is as though precisely the features that make man human are assumed away or swept under the rug by employing the fictional ‘Walrasian auctioneer.’ In the timeless world of general equilibrium there can be no process, no ‘how we get from here to there,’ but rather just ‘here’ and ‘there.’ To make the human element central to economic analysis, however, means to explore the process that human actors engage in as they attempt to better their situations. Simply describing actors’ start states and the end states that would result were they able to achieve their ends ignores precisely the process of movement that economics needs to explain.

A key element of the neoclassical research effort described above, is the examination of comparative statics as a means to understanding the welfare and efficiency properties of economic outcomes under varying conditions. This endeavor, however, largely ignored the role of acting man in economic analysis. The Samuelson-Bergson social welfare function, which was to represent the aggregate preferences of all members of society, dealt with individuals in such an abstract way as to virtually purge them completely from the analysis. Rather than understanding human preferences as the constantly changing, immeasurable and creative products of choice and decision making, neoclassical welfare economics treated them as the homogeneous, static outcomes of deterministic assumptions. In a sense, the neoclassical notion of welfare economics divorced eco-



nomics from man. In light of Arrow's impossibility theorem, it became unclear in what way the construction of a social welfare function was even meaningful, but this did not prevent many neoclassical economists from continuing to employ them as valid and significant means of analyzing the welfare properties of differing static states. In the end, while neoclassical economics succeeded in making economics look more like physics, it is questionable to what extent it developed our understanding of market processes and fallible human behavior that characterize the real world.<sup>7</sup> Without a doubt, formalism added technical sophistication to the field, but these advances did not come without a cost in terms of the human element's centrality to economic study.

Ultimately, this technique-driven modeling type of economics also ran into a problem with its twin sister — statistical measurement. What is the empirical relevance of the model? Anomalies accumulated and models' irrelevance to the real world was highlighted by both friends and foes alike. Something had to change. However, what has changed is not the 'model and measure' mentality, but rather the tools of the modeling.

#### **IV From Bad to Worse : Formalistic Historicism**

The most recent trend in mainstream economics is grounded in the increasing influence of game theory. John von Neumann and John Nash, key players in the development of game theory, were both trained mathematicians. Another key contributor was von Neumann's co-author, Oscar Morgenstern. Morgenstern, who can be placed within the Austrian tradition, attempted to emphasize the importance of imperfect foresight and the role of the market process. However, in the

end, Morgenstern's insights were discarded and the game theoretical structure was built around static assumptions such as homogeneous beliefs and preferences and perfect foresight of the players involved (Mirrowski 2002). In short, Morgenstern's questions were discarded as the central emphasis and focus was instead placed on the technical aspects.<sup>8</sup>

Although game theory was first met with great interest and enthusiasm, this quickly dwindled as many in the profession had difficulty extending the framework beyond the two player games von Neumann and Morgenstern had focused on. Rizvi(1994) contends that game theory truly took hold in the economics profession when it was realized that there were major difficulties with the general equilibrium framework. Among these difficulties was the inability of general equilibrium theory to account for imperfect competition. Simply put, game theory allowed theorists to analyze many scenarios where general equilibrium theory had little to add.

In line with the criticism of neoclassical economics, perhaps the most substantial criticism of game theory is that it distorts the nature of the economic actor. Simplifying assumptions are made in order to model various scenarios which otherwise would be too complex. In many cases, for instance, it is assumed that players know more than they actually do (or could). In such instances, these models are as unrealistic as the neoclassical models which assume that economic actors possess perfect knowledge. In evolutionary game theory, strict rules are set up which players must follow as if they were automata devoid of unique characteristics and traits — i.e., preferences, tastes, imperfect foresight, etc. Further, these foundational rules assume away the entrepreneurial aspect of human action. In cases where perfect

knowledge is assumed, there is simply nothing new for actors to learn. And, in cases where players' actions are severely restricted via the rules of the game, their ability to be alert to new opportunities is extremely limited.

In connection with the above, we must also address the issue of equilibrium in game theory. While general equilibrium theory focuses on one final static equilibrium, the Folk Theorem tells us that there can be multiple equilibria in many game theoretic situations. As mentioned above, both neoclassical and game theorists have failed to consider the market process with emphasis on learning and discovery to solve the coordination problem put forth by Hayek (1948, 33-57). Simply put, how do agents, with imperfect knowledge and foresight, coordinate their activities with others? Too often, this critical question is assumed away via the assumptions of the model. Further, assuming that individuals are able to coordinate their activities, it is far from clear that they would be able to obtain an equilibrium given the constant introduction of new knowledge and information. Given this realization, it is clear that many game theoretic models describe a fixed moment in time with a given stock of knowledge. Finally, the question of universality must be addressed. In many cases, game theorists model some scenario which shows the achievement of one of the multiple potential equilibria as dictated by the Folk Theorem. They then claim that the equilibrium achieved is not universal. That is, the equilibrium achieved is one of an infinite number of possible equilibria which happened to hold at the particular time and place being analyzed, but which does not necessarily hold in all cases with similar circumstances.

We find ourselves in the undesirable situa-

tion where the defining characteristic of economic analysis is no longer the universal propositions that are produced through a variety of languages (natural and formal), but instead where any particular proposition can be proven using one language (formal).

We term this intellectual position *formalist historicism*.

The Austrian arguments against historicism are no longer strictly relevant, and the Austrian arguments against formalism while relevant, misunderstand how much the ground has shifted since the 1950s. In the previous period, the universal propositions claimed by economists from Smith to Menger were represented in a formal model only under highly restrictive assumptions. Under these restrictive assumptions, a unique price and quantity vector could be found which would clear the market. But these restrictive assumptions were significantly divorced from reality. Problems of asymmetric information, imperfect market structure, externalities, and public goods lead to suboptimal allocation and use of scarce resources. The theory of market failure thus developed in response. But there was always a problem of the *ad hoc* nature of the introduction of these deviations from the ideal.

New Institutional Economics (law and economics, public choice, New Economic History, etc.) developed in reaction to this *ad hocery*. The result was the development of the theory of government failure and comparative institutional analysis. But these developments were made in largely natural language and many of the formalist establishment did not accept these results. Theorists were confronted with a choice : either return to the institutionally rich world of natural language, or push into a realm of formalism that permits particularism.

The majority of economists in the mid-1980s were willing to take the analysis into this formalistic historicism (a position that would have been absurd in the 1950s). Concepts such as multiple equilibria and path dependency emerged as unifying themes in economic analysis. Despite a certain liberation this brought, it didn't bring us any closer to the study of man.

## V Where Do We Go From Here?

There are many problems with formalistic historicism, but it has also sewn the seeds of its own correction. Since theories can be developed to prove anything, empirical work is relied upon more and more to adjudicate between theories. This is most evident in the work on growth theory, but it permeates all fields in contemporary research. This demand for empirical work has coincided with an increasing acceptance of alternative forms of evidence. In-depth case studies, comparative historical analysis, interviews and surveys are accepted as evidence alongside large-scale econometric models.

It is our contention that this opening up of the nature of acceptable empirical work represents a great opportunity for Austrians to bring man back into the analysis. The Old Historical School thought that anthropological and narrative historical evidence demonstrated the particularities of man. Ironically, it is our argument that by exposing formalistic historicism to evidence from anthropology and history, we regain the universal nature of the sciences of man. If there was nothing universal about the human condition, then what could we learn from studying others? Other people would remain beyond our capacity to understand. On the other hand, if all individuals were identical, then what could we learn from studying others? Nothing,

because there would not be anything unique to their circumstances. Economic understanding increases by framing questions in terms of the particular but analyzing in terms of the logic of choice. Interpreting the particular by way of the universal yields the *analytical narrative*.<sup>9)</sup> The analytical narrative entails the application of Austrian economics as a tool of interpretation of ethnographic data. This approach emphasizes the open-endedness of choice as opposed to the close-endedness required by formalistic interpretations of rational choice. The analytical narrative, if conducted in the way we suggest, brings us back to the lower right-hand quadrant in diagram. The man as chooser returns with both his human character and his particular circumstances.

The entrepreneurial element in human action operates on our knowledge of particular time and place to realize the gains from mutually beneficial interaction. In the analysis of the market process championed by Mises and Hayek, the entrepreneur is the prime mover. This entrepreneur is caught between alluring hopes and haunting fears as he attempts to recognize the hitherto unrecognized, or improve upon the delivery of the recognized, opportunities for exchange. The market process emerges out of the previously existing imperfections on the market. Today's inefficiency represents tomorrow's profit opportunity for the entrepreneur who is able to fix the imperfection in a way that allows individuals to realize gains from exchange that had previously gone unexploited.

Converting either man or the economy into a machine necessarily eliminates the messiness of entrepreneurial discovery and adjustment from the process. It is also the case that the machine imagery pushed institutional contingencies out of economics. But Austrian



analysis, by insisting on the central human element in economic life and the institutional context within which human beings act, maintains a position within the economics discipline that is analytically rigorous (logic of choice) and institutionally rich (narrative history).

## VI Conclusion

The intellectual landscape of modern political economy has shifted considerably since the beginning of the 20<sup>th</sup> century. We have argued that the discipline began the century in a position where economists thought they had discovered universal laws which they could express in the prose of natural language. Their opponents denied this, but they did so by arguing that economic theory was not universal. By mid-century, the discipline moved to a position where economists thought they had refined the universal principles by expressing them in the non-ambiguous language of mathematics. However, to convey economic propositions in such terms, restrictive assumptions had to be employed to assure mathematical tractability. The entrepreneurial element of human action was a casualty of the mathematical revolution in economics because it defies tractability. Unfortunately for economic science, we cannot explain the operation of the market and the adjustments of the price system without recourse to the entrepreneur.

Instead of recognizing this, economic discourse embarked on a detour which resulted in a form of formalistic historicism dominating economics by the last decade of the 20<sup>th</sup> century. We enter the new century with hope that the universal logic of economic science and the contingencies of human volition and historical conditions can coexist under the intellectual umbrella of the sciences of

human actors. This is the inspiring vision that Ludwig von Mises provided in 1949. More than fifty years later, Mises's pioneering work provides the foundation for a science of economics that is at once humanistic in its methods and humanitarian in its concerns.

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#### Notes

- 1) While the Old Institutionalists rejected the modeling strategy, they embraced the importance of measurement.
- 2) As Smith wrote in the 1755 manuscript which summarized his research and eventually resulted in *An Inquiry into the Nature and Causes of the Wealth of Nations* : "Little else is requisite to carry a state to the highest degree of opulence from the lowest barbarism, but peace, easy taxes, and a tolerable administration of justice ; all the rest being brought by the natural course of things" ([1776] 1976, xi). Also see Stewart's discussion of the "Life and Writings of Adam Smith" written in 1793 and reprinted in Smith's *Essays on Philosophical Subjects* (1980).
- 3) Thus, we are suggesting that the Arrow/Debreu model, rather than formalizing the invisible hand, has actually inhibited our understanding of it.
- 4) See Mises(1949, 17-18) where he discusses human action as the ultimate given.
- 5) According to Kirzner : "[T] he competitive market process is essentially entrepreneurial... The entrepreneurial element in the economic behavior of market participants consists... in their alertness to previously unnoticed changes in circumstances which may make it possible to get far more in exchange for whatever they have to offer than was

hitherto possible"([1973] 1978, 15-16).

- 6) The term "neoclassicism" is necessarily vague and encompassing. While recognizing the significant variants within the neoclassical tradition, our criticism is directed at the formalistic strain of neoclassical economics. It is our contention that the term neoclassicism has become obscured in the latter part of the twentieth century. Originally, neoclassicism entailed universal propositions about the world derived using marginal analysis. In the second half of the twentieth century, the scope of neoclassical economics transformed from elaborating universal propositions about the world and to formal analysis with particular implications. For example, is it reasonable to place both Joseph Stiglitz and Robert Lucas in the neoclassical camp? The drastic differences between the two highlights the obfuscation of what neoclassicism entails. Also see Fisher's(1991)critical essay of modern industrial organization. Fisher argues that the main organizing principle of modern industrial organization is that there are no organizing principles. Modern theory simply demonstrates that anything can happen, given different assumptions.
- 7) Rosenberg(1994) argues that economics can either be interesting mathematics or an empirically progressive science but not both.
- 8) Game theory focuses on three important facts of human action and social cooperation : strategic interaction, bargaining and negotiation, and framing — how the rules of the game influence the way players play the game. The major weakness of game theory from the standpoint of Austrian economics is the common knowledge assumption(See Foss 2000).
- 9) For the most well known rendering of the analytic narrative, see Bates et al. (1998).