Review

Out of Equilibrium☆

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Abstract

This review article takes the volume by Mario Amendola and Jean-Luc Gaffard Out of Equilibrium as the starting point of a general assessment of the scope and perspectives of out-of-equilibrium economics. After describing the particular subject-matter covered by Amendola and Gaffard, the author calls attention upon the fundamental role in their treatment of time, coordination, and the magnitude of responses. The general foundations of the ‘out-of-equilibrium’ approach are then considered. In this connection, the author argues that making use of illustrations (rather than formal proofs) can still show in a conclusive way that widely held beliefs are not valid as general propositions. It is also maintained that, apart from these ‘anti-general’ results, the out-of-equilibrium approach can lead to positive generalizations of considerable power and significance. In conclusion, this essay maintains that coexistence of equilibrium and out-of-equilibrium analysis is possible, and mentions research and policy areas (such as coordination failures and rational regulatory policy) in which equilibrium theory can provide invaluable insights for an out-of-equilibrium investigation © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

This book is a major contribution to the field that has been called ‘evolutionary’ or ‘out-of-equilibrium’ economics. This type of analysis frees itself from dependence on the concept of equilibrium and instead focuses on intertemporal processes and, in particular, on the portion of the dynamic behavior that has sometimes, misleadingly, been referred to as ‘the transitory component’ of the time path. For in an economy in which there is no mechanism that rapidly reduces the transitory components to negligible magnitudes and in which developments are characterized by frequent random shocks, all of history may be a tale of transitory behavior and nothing else. Reality, then, is analogous to the situation so aptly described in Abba Lerner’s perceptive remark: ‘In the long run we just arrive at another short run.’

This review is divided into two parts. The first describes the particular subject matter covered by Amendola and Gaffard, and illustrates their conclusions about behavior and public policy. The second will deal with the out-of-equilibrium approach per se. It will be argued that its methods are considerably more powerful and definitive in their results than they are sometimes believed to be. Thus, the work in this field has already made valuable contributions to the economic literature and promises many more. However, I will conclude that in terms of analytic method economics will benefit if a thousand flowers are encouraged to bloom. There is no one approach available to us that enables us to solve all problems. In particular, both equilibrium and out-of-equilibrium analysis is badly needed. The legitimacy of either of these does not imply that the other is indefensible, and the literature would be substantially impoverished by rejection of either.

2. The Amendola–Gaffard application of the out-of-equilibrium methods

The particular economic subjects on which the book focuses are emphatically conventional. They lie at the center of the macroeconomics section of every introductory text book. In effect, the authors have chosen to revisit the subject matter of Keynesian and monetarist theory, bringing up all of the subjects we expect such material to include — notably, unemployment, inflation, wages, money supply and economic growth. It is their less orthodox method that sheds new light on the subjects discussed. Indeed, the conventional subject matter of the book enhances the difficulty of the challenge the authors have chosen to accept. For they have undertaken to re-examine this material that has been explored over and over again, promising to provide new insights and new conclusions. And in this, as in the remainder of their effort, they have clearly succeeded.

The fundamental observation that emerges from the analysis is that the central phenomena — growth, unemployment and inflation — are neither exclusively demand side nor exclusively supply side issues. Here, as in other parts of economics, both blades of Marshall’s scissors are at work. Moreover, when problems arise, the trouble is sometimes to be found in the one blade, sometimes in the other. For
example, as Blaug recently has rightly emphasized, at the time of, say, James Mill and Ricardo, the prime obstacle to growth was lack of capacity — a paucity of investment. Thus, saving, rather than an impediment to growth, was instead its most critical requirement. At the time of the Great Depression, in contrast, the problem, arguably, was inadequacy of demand, so that saving, instead of facilitating growth, constituted a severe impediment.

Out-of-equilibrium economics constantly draws our attention to such complexities and to the fact that they are likely to work differently at different times. However, it goes much further than this. It emphasizes the fundamental role of timing, of coordination and of the appropriate magnitude of responses, which lead to positions basically different from those of both the Keynesians and the monetarists. Indeed, the coordination issue brings the authors back to some slightly older work — the fluctuations model of Friedrich Hayek. To oversimplify, it will be recalled that in this model depressions are caused by lack of coordination in timing of monetary injections, the construction of capacity and the emergence of the resulting increases in output. For example, during the period of real investment the flow of earnings is enhanced by the employment of construction workers, but there is no matching increase in output because the new capacity to be created by the investment has not yet become available. By the time the new plant and equipment does come on line the flow of purchasing power of the construction period will have slackened while the flow of final products will have grown. The threat to economic prosperity here clearly is a matter of the timing of the process and failure of coordination of production and demand. This is the meat and potatoes of out-of-equilibrium analysis, with its effective employment of formal dynamic relationships and its ability to generate intertemporal trajectories that clearly demonstrate the difficulties that can emerge.

Amendola and Gaffard are able to demonstrate that where such timing-coordination issues are the problem, the policy proposals of both the monetarists and the Keynesians can be simplistic, ineffective and even counterproductive. The adoption of a few simple rules of monetary behavior designed to serve as automatic stabilizers is shown easily by concrete examples to invite aggravated fluctuations and general instability. On the other hand, the notion that one can micro-manage the economy by carefully crafted and quickly instituted acts of intervention is equally indefensible, given the sensitivity of the subsequent macroeconomic developments to small differences in timing and magnitudes of the intervention that the policy maker cannot expect to be able to recognize, let alone to measure with the requisite accuracy.

Moreover, the authors observe, “…out of equilibrium there is no way for economic policy to be neutral. As a matter of fact the very notion of neutrality implies considering an equilibrium state of the economy which may or may not be affected by an external action” (p. 249).

The authors persuasively reject the notion that one can hope to formulate any intertemporal target and then force the economy to follow the selected path with any degree of close approximation. Rather, they propose an approach that selects a broad band of acceptable economic performance and the search for policies that can be hoped to keep the economy within the selected tolerance limits.
The book also illustrates dramatically the perils of neglect of the timing and coordination issues. It demonstrates the possible emergence of what it calls a ‘productivity paradox’ and of what may correspondingly be called the ‘wage paradox’. As the authors describe it, “…the productivity paradox, that is, a fall in productivity notwithstanding the introduction of a more productive technique…[is] essentially a macroeconomic phenomenon…[that] depends on the co-ordination failures arising in a context where there are problems of intertemporal complementarity of production” (pp. 223–4). For example, if the introduction of a more productive technique in a few industries is not matched by increased availability of complementary outputs and appropriate changes in money supply, the result can be unemployment for some period and some degree of stagnation that leads to a decline in the productivity of the economy overall.

Similarly, the authors demonstrate that the prescription of reduced real wages as a means to decrease unemployment can backfire dramatically if ill-timed or excessive. “Weak flexibility may help co-ordination, while strong flexibility may result in fluctuations so pronounced as to be a threat to the viability of the economy” (p. 244). Such conclusions are no mere intuitive judgments — the book demonstrates them rigorously by providing explicit models in which increased wage flexibility leads the generated time paths of output, employment and other key variables to fluctuate more violently and in which the oscillations become explosive. One can easily offer intuitive explanations of the possible disequilibrating effects of excessive wage cuts in terms of the effects on expectations, or the distribution of income among recipients of income with different propensities to consume. However, the matter goes deeper and further discussion is best left to the next section of this review, where the out-of-equilibrium approach is discussed in general terms.

3. What the out-of-equilibrium approach accomplishes

In this section I will show that the methods of out-of-equilibrium literature are powerful tools of analysis and that they are capable of providing invaluable insights. However, first it is appropriate to deal with several grounds on which questions of the reliability of those insights may be raised, showing that such reservations are not well founded. The two main issues are the tendency for the analysis to rely heavily on simulation rather than categorical analytic solutions, and the sensitivity of the results of the simulations to very small changes in parameter values, model structure and initial conditions. Both of these attributes may appear to indicate that the analysis is incapable of providing reliable and general conclusions, with the result that the fruits that can be expected from such a study are very sparse or inconclusive.

The point, of course, is that no matter how many scenarios are explored by simulation one can never be sure that the results are representative or that there is not some very different possibility that the illustrative calculations have failed to reveal. As is suggested by the old Yiddish proverb I have cited many times, ‘for example’ is not a proof.”
However, much of this is misunderstanding of the true power of the out-of-equilibrium approach. The proper first reply to the proverb is that 'for example' can certainly be a disproof. Illustrations can demonstrate conclusively that widely held beliefs, even some that have been derived rigorously from (rather oversimplified) models, are just not valid as general propositions. While things may sometimes work out as is usually believed, it is very possible and perhaps even very likely that outcomes will be entirely different. Thus, the policy or behavior adopted on the basis of the general belief can turn out to be counterproductive or even highly damaging.

In short, a negative result, a proof that some behavior pattern is not the universal state of affairs, must be regarded as just as substantive as an affirmative result, particularly if the latter is conditional, affirming that whenever condition A is present we can expect consequence B to occur. Unwillingness to accept the substantive character of negative results reminds one of the unwillingness of early arithmeticians to accept the legitimacy of negative numbers or zero — and imposing the term ‘imaginary’ upon one of the components of a complex number. Moreover, out-of-equilibrium economics is hardly the only method employed by our discipline that characteristically provides a preponderance of what one may refer to as ‘anti-general results.’ The same is clearly true of general equilibrium theory and game theory, for example. Indeed, it characterizes all approaches that focus on the complexities of reality rather than seeking the useful oversimplifications that other economists have adopted to facilitate analysis. The evident fact is that where reality is complicated simple generalizations become scarce or may just not be possible at all.

Thus, when out-of-equilibrium analysis demonstrates that a wage reduction, while it may sometimes stimulate employment, can in other circumstances exacerbate it and lead to dangerous oscillations, the result is surely substantive. It is a clear and unambiguous warning to be disregarded by policy designers at the economy’s peril.

However, this is not all there is to the illumination one can expect from out-of-equilibrium analysis. It can provide more than the sort of anti-general results I have just been discussing. It can also yield affirmative generalizations of great power and significance. Their nature is best illustrated by analogy with engineering control analysis and its implications about automatic control mechanisms such as thermostats that regulate temperature or automatic steering mechanisms that correct the path of airplanes or ships. Because these apparatuses are characterized by lags and inertia, one can easily show that a mechanism that makes moderate corrections can be stabilizing, while a similar apparatus that makes corrections that still always go in the proper direction but that are excessively powerful will move the controlled object away from the desired trajectory and are likely to generate oscillations that can well be severely destabilizing. For example, consider a steering stabilizer for a boat that turns the boat toward the right whenever it happens to move leftward from its desired path, and does the opposite in response to any rightward deviation. Because of inertia, a strong correction mechanism will cause a boat that has deviated to the left to overshoot its desired path and swing over to the
right by more than its previous rightward deviation, then cause it to move still further to the left because of the next overcorrection, etc. Ultimately, the boat may end up moving in circles or swinging violently from side to side.

The analogous danger affects all automatic stabilization mechanisms, including economic stabilizers. That is the ultimate reason for the wage paradox brought to our attention by Amendola and Gaffard and cited here earlier. Excessive wage flexibility is like an over corrective boat-steering mechanism. It is inherently destabilizing and a source of oscillation. That is not a matter of accident or something that can happen occasionally. Rather, the danger is quite general, and recognition of this problem is a valuable underpinning of some of the policy conclusions offered by this book. It follows the useful example of control engineering in focusing attention on processes that promise to keep oscillations within viable limits rather than pursuing the unattainable objective of total elimination of all undesired deviations.

One more advantage can be noted for the authors' simulation approach. As is well known, it is often possible to obtain analytical solutions for dynamic models such as those constructed in this book. Such solutions, yielding mathematical expressions for the intertemporal trajectory of the variables studied, can be very valuable and can tell us a good deal about their behavioral characteristics. But sometimes such analytic solutions are not possible. And even where they are, the relatively easy task involved in simulation of the time path can be very stimulating to intuition and understanding. It is indeed fortunate that dynamic models lend themselves to such simulation.

4. Conclusion, with a few reservations

Evidently, any respectable review must find some fault with the work on which it is reporting or must express some reservations. Let me, therefore, offer a few such remarks before concluding. There is only one reservation of any real significance that needs to be expressed, and it should be emphasized that it is not a complaint about anything the authors of the book have said, but rather something they have, perhaps, not emphasized sufficiently. This is the enduring value of equilibrium analysis, which is in no way diminished by the accomplishments and promise of out-of-equilibrium materials. For example, the equilibrium analysis of models of perfect competition and of their welfare properties offers invaluable guidance for the formulation of rational regulatory policy. Thus, the Ramsey pricing formula has become the cornerstone of the theory of regulatory policy and now provides critical guidance not only to theorists but also to courts and regulatory agencies throughout the world. It is no criticism of out-of-equilibrium analysis that it is not an instrument likely to produce results of this sort. Many other examples are easily provided. And even in a world condemned to be forever out of equilibrium, if its scenarios entail any degree of stability, it is surely illuminating to learn the directions in which market forces are pushing matters — as only the equilibrium analysis can reveal. The point is that economists can hardly be deemed to be
oversupplied by valid analytic methods. Surely we must welcome them all, and use each where it promises to be most fruitful.

This thought also brings up another. A central problem for the economy that is brought to our attention by out-of-equilibrium analysis is coordination failure, for example, failure of money supply to react promptly to changes in investment needs. But this suggests the possibility that the market mechanism, with all of its commendable powers, may have forces that tend automatically to counteract failures of coordination — to make the timing of changes in wages, for example, follow the stages of the Hayekian investment scenario somewhat more closely than might have been expected. I do not know whether there are any such coordinating market forces, but I can think of cases where their existence seems plausible. It seems a promising line of research to study where such forces may be present, and the degree to which they can be expected to ameliorate some of the coordination problems that out-of-equilibrium theory has brought to our attention.

Of course, any such book must elicit some minor quibbles from the reader. I am prepared, for example, to raise questions about the authors’ passing remarks on doctrinal history. Thus, they say: “Malthus clearly saw that an increase in necessary consumption could actually take the economy out of equilibrium” (p. 234). Having studied the turgid and confused Malthusian discussion of the subject I doubt that he saw anything about the matter ‘clearly.’ Like Keynes, the authors attribute 20th-century insights to that early 19th century author. Similarly, I see little resemblance between Ricardo’s noted chapter on machinery and the ‘machinery effect’ attributed to him by the book.

However, the minor nature of these quibbles only serves to underscore how little there is to complain of in this book. It is a significant contribution by two powerful analysts that clears an important path for many future investigators. Surely, little more than this can be said in appreciation of any newly published work.