The search for disequilibrium micro foundations of macroeconomics

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I am currently on leave, working on an intellectual biography of Paul A. Samuelson. I am grateful to the Leverhulme Trust for its support. Though I take responsibility for this paper, it is based on a book written together with Mauro Boianovsky, which provides the evidence on which the paper is based. This paper is a first draft, and makes no claim to be a comprehensive account of the book.
1. Introduction

Students of macroeconomics learn something about the history of their field from their textbooks. Concerned, quite legitimately, to present modern theories as the state of the art, they tell stories of progress—of how theories have been shaped by theoretical critique and by encounters with macroeconomic events. The result of this is that histories of the field are shaped by current understandings and concerns. Episodes that appear to have been false starts, blind alleys and outright mistakes are either omitted or simplified in the interests of explaining how present-day ideas came to be.

The role of the specialist in the history of economics is to challenge such accounts. This can be done in different ways. One, represented by Michel De Vroey (e.g. 2004) involves rigorous analysis of the logical structure of economic theories. This approach, often called “rational reconstruction”, has its place and in skilled hands can lead to insights that would otherwise not have been obtained. However, the book by Mauro Boianovksy and myself, *Transforming Modern Macroeconomics: Exploring Disequilibrium Microfoundations, 1956-2003* (2013) adopts a different approach. It involves trying to understand past economic ideas in their own terms—as they looked to the economists who held them. This involves trying to understand what, to the modern economist, seem false starts and lines of inquiry that appeared to lead nowhere, or led to outcomes different from those that were expected.

Disequilibrium macroeconomics is an excellent case study illustrating such issues. It involves theories, and even basic concepts and presuppositions, that are no longer part of the macroeconomic mainstream, that appear contradicted by experience, and that fails to deal with problems not thought central to the field. It is a topic from which macroeconomics has moved on. This is illustrated by one of its most prominent exponents, Robert Barro, who made his career through developing theories that ran completely counter to his work with
Herschel Grossman (Barro, & Grossman 1971). From exploring markets in which prices were taken as given, he developed theories for a world of rational, far-sighted agents operating in an environment of perfect competition. Such ideas have become so pervasive in macroeconomics, that even prominent new Keynesians, such as Olivier Blanchard (2003) and Michael Woodford (2003) can leave it out from accounts of how macroeconomics has evolved (though Blanchard (2008) does cover the topic in an article on the neoclassical synthesis). Yet, despite this neglect, disequilibrium macroeconomics was once one of the hottest topic in macroeconomics.

So whereas De Vroey dissects disequilibrium theories, revealing hidden assumptions about the how markets operate, our concern is with recovering what might, loosely, be called the research programs of those involved in constructing disequilibrium theories. It involves understanding theoretical choices that, because they were made without the benefit of subsequent developments in macroeconomics, do not always make sense. Rather than concluding that they were mistaken, our aim is to uncover the way they looked at the time. The most striking illustration of this is the claim that disequilibrium macroeconomics, widely thought to analyze the consequences of price rigidity and rendered irrelevant by the inflation of the 1970s, was in fact developed specifically to understand the problem of stagflation, a phenomenon believed by some economists to be inconsistent with perfectly competitive markets.

2. From Lange to Leijonhufvud

Mauro and I present the history of disequilibrium macroeconomics as running between two, partly symbolic dates, 1956 to 2003, and two books: *Money, Interest and Prices* (Patinkin 1956) and *Interest and Prices* (Woodford 2003). Its roots, of course, go further back, to the
early debates over Keynes’s *General Theory* (1972). One of the theoretical strategies, pursued explicitly by Modigliani (1944) was to view Keynesian economics through the lens of Walrasian general equilibrium theory, giving rise to the problem so thoroughly discussed by De Vroey, of how involuntary unemployment might exist. Of particular significant was the work of Oskar Lange, that Goulven Rubin has studies so thoroughly (e.g. Rubin 2012; Rubin 2011) for it was Lange who, in his lectures, attended by Patinkin, who pursued the idea that Keynesian problems might be a symptom of a system in which the Walrasian equations for general equilibrium were inconsistent. Patinkin argued that, given the real balance effect, such inconsistency would exist only in the short run. However, he attached great importance to the short run, and he introduced an analysis of the labour market that took explicit account of the consequences of firms’ not being able to sell as much as they wished in the commodity market, one of the key elements of disequilibrium theory as it emerged in the 1970s.

The two names most closely associated with disequilibrium theory were Robert Clower and Axel Leijonhufvud. Clower’s “The Keynesian counter-revolution” (Clower 1965). This presented an idea that came to be central to the literature on disequilibrium macroeconomics—what he called the “dual decision hypothesis”. Expenditure on consumption goods would, Clower pointed out, be constrained by realized sales of labor: in the presence of involuntary unemployment, this would be less than the amount of labour derived by maximizing utility subject to a budget constraint. This concept could be generalized into that of “spillover effects”. Disequilibrium in one market would impinge on demands and supplies in other markets. This was the key insight that distinguished disequilibrium macroeconomics from equilibrium macroeconomics.

Leijonhufvud’s role, in an immensely popular book, *On Keynesian Economics and the Economics of Keynes* (Leijonhufvud 1968) was to provide an explanation of why any model
that claimed to be a general theory should take account of such effects. Walrasian models
achieved equilibrium only through a fictitious “auctioneer”. In the absence of an auctioneer,
there was no reason why markets should necessarily be in equilibrium. If equilibration of
supply and demand took place in real time, transactions would necessarily take place at
disequilibrium prices, and as a result quantity constraints and the spillover effects identified
by Clower would come into effect. It might be that equilibrium would eventually be
achieved, but adjustment processes should take account of spillover effects.

This was far from the whole of Leijonhufvud’s thesis for the book also contained
arguments about aggregation and about interest rates, presenting the General Theory as an
argument about intertemporal coordination failure. Such arguments were essential to
reinterpreting Keynes (and perhaps the latter should have been given more attention during
the 1970s) but it was the point about the absence of an auctioneer that was taken up in the
1970s in the literature on disequilibrium macroeconomics.

In the same year, an article was published by Robert Solow and Joseph Stiglitz (Solow,
& Stiglitz 1968) that used such constraints to construct a model of the short run. Their model
anticipated much of what came later, but was largely neglected: they considered the problem
of providing microfoundations for their macroeconomic model too trivial to need stating
explicitly; and the article was framed in terms of the “two Cambridges” controversy, that was
of little interest to many economists (see Assous 2013; Backhouse 2014).

3. Two lines of macroeconomic thought

During the 1970s, two lines of macroeconomic theory developed. The one that became most
prominent was the development of “equilibrium” microfoundations by Edmund Phelps
(****) and his associates. This work turned to search theory to provide an account of why
labour markets might exhibit unemployment. As De Vroey has argued, this changed the way unemployment was conceived. One of those associates was Robert Lucas, who went on, assisted by economists whose names are now too familiar to need introduction, to lay the foundations of what became known as the new classical macroeconomics. Though it is not disequilibrium macroeconomics but its opposite, it forms the essential background lines of development that are central to the story that Mauro and I tell and is the subject of one chapter.

The other line of development was to build on the insights of Patinkin, Clower and Leijonhufvud to develop formal models of disequilibrium. Here terminology becomes complex, for equilibrium has many meanings, two of which are central to our argument. It can mean equality of supply and demand or it can mean the solution to a system. In the Walrasian world these are the same but once spillover effects are introduced, the system may have a solution in which supply and demand are not equal in all markets. Thus it became common to speak of an “equilibrium with rationing” even though the model might be described as a “disequilibrium” model.

One of the key points we argue in our book is that this second line of development—disequilibrium macroeconomics—had several strands. The article that brought together the two spillover effects developed by Clower and Patinkin (constraints in the labor market affect demand for commodities; constraints in the goods market affect demand for labor) was “A general disequilibrium model of income and employment” by Robert Barro and Herschel Grossman (1971). They showed how, even if the real wage were at the Walrasian level, spillover effects might result in an equilibrium in which there was rationing of both goods and labor. Consumers could not buy goods because they could not sell as much labor as they wished; and firms would not employ labor because consumers could not buy enough
consumption goods. Spillover effects interfered with the mechanisms that should bring about full employment. This article stimulated a large literature, that continued into the mid-1980s, working out the implications of prices that were less than perfectly flexible. A decade after its publication it was the most widely cited article ever published in the *American Economic Review*.

Another strand in the literature that evolved during the 1970s is best represented by *Disequilibrium Theory*, the Berkeley PhD thesis Jean-Pascal Bénassy (Benassy 1973). This was significant in at least three respects. Unlike Barro and Grossman, but like the parallel work of Jacques Drèze (Dreze 1975) it integrated macroeconomic disequilibrium modeling into the literature on general equilibrium theory. Bénassy also explored the links between disequilibrium theory and imperfect competition, a theme that was eventually seen as central to this type of theorizing. And he also developed a simple macroeconomic model comprising a single aggregated consumer and a single aggregated firm, that could generate outcomes in any one of three regimes: inflation (later termed “repressed inflation”), unemployment and stagflation. If wage and price dynamics were added, the economy might end up either in the Walrasian equilibrium or at Keynesian or other equilibria, depending on the initial conditions and the degree of monopoly in different markets.

When such models were first introduced, there were hopes that disequilibrium theory would offer what, using language taken from the then-fashionable theories of Thomas Kuhn, was often described as a new paradigm in economics: an alternative to the simplicities of Walrasian theory. By the end of the decade however, despite the extension of the theory in many directions (for example, to allow for dynamics and the holding of inventories), it was seen rather differently, more as a specialist technique, applicable to situations in which prices were not free to adjust freely. The most extreme example of this was its application to
command economies where prices were controlled by administrative fiat, by economists such as Richard Portes. The macroeconomic mainstream had moved elsewhere.

It was at this time that the idea of “micro foundations” for macroeconomics became established in the literature. Surveys of the field were undertaken by Roy Weintraub (1977), Jean-Michel Grandmont (1977) and Allan Drazen (1980) and two volumes of conference papers involving major figures in the field (1977; 1978). Also published was an elegant exposition of the theory, Edmond Malinvaud’s *The Theory of Unemployment Reconsidered* (1977). Using diagrams similar to ones Bénassy had used in his thesis, Malinvaud turned to what he preferred to call not disequilibrium theory but general equilibrium theory with a specific concept of equilibrium, to make sense of rising inflation and unemployment. Stagflation was not the evidence against disequilibrium theory but provided the rationale for its use.

4. New Keynesianism to the new neoclassical synthesis

As inflation and unemployment in most industrial countries rose during the 1970s, economists’ interest in the new classical macroeconomics increased, though the speed with which the “revolution” took place should not be exaggerated. The reasons for this are beyond the scope of our book and this paper but have to do with both the need to explain the dynamics of inflation and the development of new empirical techniques. There may also be a connection to a shift in the political climate towards greater skepticism about the ability of governments to intervene successfully in economic activity that extends beyond macroeconomics. It came to be widely accepted that the basic argument new classical assumption—that behavior should be modeled explicitly as the outcome of rational
(maximizing) agents, where rationality extended to the formation of expectations as well as to price and quantity decisions—was correct. Perhaps as important, despite conclusive proofs that rigorous aggregation over heterogeneous individuals was impossible, and that aggregates could not be assumed to behave in the same way as individuals, the assumption of the representative agent was widely regarded as consistent with theoretical rigor. The result was that, by the end of the decade, Keynesians were on the defensive. The outcome was what became known as the new Keynesian macroeconomics which accepted the core new classical assumptions, but sought to develop micro foundations based on explicit models of asymmetric information, imperfect competition, menu costs and other factors that would interfere the neoclassical theory of price formation.

By the mid 1980s it was possible to discern two main approaches to macroeconomics. On one side was real business cycle theory which used competitive representative-agent general equilibrium models together with the assumption of technology shocks to explain macroeconomic phenomena using new econometric methods such as “calibration”. On the other were new Keynesians, who posited market imperfections, including imperfect competition to explain Keynesian phenomena. To cut a long and complex story short, that even in the book we can only sketch, faced with results derived using increasingly sophisticated econometric techniques, the two approaches began to converge. Real business cycle theorists found that they needed to invoke lags and rigidities to explain a degree of serial correlation in the data, whilst new Keynesians found elements of real business cycle theory useful. Faced with this, the aspect of disequilibrium theory that survived into mainstream macroeconomics by the end of the century was imperfect competition. Economists including Bénassy (Bénassy 2002) and Woodford (Woodford 2003) incorporated imperfect competition into dynamic, stochastic general equilibrium models blurring
boundaries between the two main approaches to macroeconomics that had been dominant a
decade or more earlier.

5. Interpretation

With hindsight, we can see many logical connections between theories that contemporaries
simply could not see. The most striking example is the parallel between’ Patinkin’s theory of
the demand for labor and Clower’s theory of the consumption function. However, prior to
Barro and Grossman, no one made the link. It was not due to lack of knowledge, for Clower’s
paper was first presented at an International Association Conference in 1962, at which Hahn
assigned Patinkin to be the discussant. A parallel might be inferred in Solow and Stiglitz
(1968), but they simply postulate a consumption function in which consumption by wage-
earners depends on realized employment without discussing its rationale. They failed to see
the point because, as has been explained, their concerns lay elsewhere. This illustrates the
importance of trying to understand the way problems were viewed at the time, not how they
look in the light of modern theory. People can be blind to what now seems obvious, and this
should be taken into account when assessing their actions.

A second notable feature of the early history of disequilibrium macroeconomics is that
Clower and Leijonhufvud were almost universally seen as its inspiration. Yet neither of them
ever endorsed the modeling of Barro and Grossman which, they believed was overly
mechanical, failing to address the key issues. What they both sought was a more general
theory of how markets operated. Here, the key figure in the background is Armen Alchian,
whose ideas lay behind both of the streams in macroeconomic theory that we distinguished in
the 1970s, inspiring both Phelps and Leijonhufvud, who developed his ideas in different
ways. The capacity of certain ideas to be developed in different directions is illustrated by
Hayek’s vision of the market as an information processing device. In his hands that became an argument this became an argument about why the efficient allocation of resources required using the market. In contrast, for Leijonhufvud, the complexity of the information processing problems provided arguments as to why markets might fail to work efficiently. It is not well known that he ended his book with the observation that perhaps economists needed to go back to Hayek.

Problems with perfect competition permeate this story. It is trivially true that as soon as one departs from perfect competition, with all the assumptions that necessitates, one is in a world of imperfect competition. The response found in the modern literature, with its insistence on formal micro-foundations, is to model imperfect competition. When that is done, what are seemingly disequilibrium models become equilibrium models in which economic agents have some monopoly power. Why then did economists choose to talk about disequilibrium theory rather than equilibrium with imperfect competition? Was it that they failed to see that imperfect competition was central? There are several possible answers. The most obvious goes back to Keynes, who was trying to demonstrate that unemployment was not caused by wage inflexibility. That claim was denied by Patinkin, who did associate unemployment with wage stickiness, arguing though it might be a short run problem, that short run might last for a very long period of time, making Keynes analysis relevant in practice. In contrast, Leijonhufvud was trying to rehabilitate Keynes’s claim through arguing that the problem was not monopoly or wage rigidity, but factors fundamental to any real-world economy: markets operated in real time and this of necessity undermined the Walrasian general equilibrium model. This might imply that competition was not perfect but the imperfection involved did not have institutional roots—it was not due to small numbers or product differentiation—but was, as Arrow (1959) had pointed out, an inevitable
characteristic of market processes. Rather than focusing on imperfections of competition in the sense of less than perfectly elastic demand curves facing individual agents, Leijonhufvud and others focused on the conditions that created these imperfections of competition.

Those who argued for disequilibrium macroeconomics had insights about the way markets worked but did not provide a rigorous formalization. Disequilibrium macroeconomics, initially intended as a more general theory of the market process, thus became associated with the Barro-Grossman model even though—an explicit, teachable model—in the views of Clower and Patinkin, it failed to capture what they were trying to express. It became easy for it to be represented as a theory of what happened when prices happened to be inflexible. This thinking is clear in the successive writings of Barro during the 1970s, causing him completely to disown the approach to economics he had helped to create. The methodological choices made by economists after the rise of the new classical economics, with its insistence on rigorous micro foundations, despite the conditions necessary for such models to hold in a world of heterogenous agents not being satisfied, made it almost inevitable that they would go down the route of imperfect competition. However, in the process of becoming more rigorous (in this sense) much of the vision that motivated Leijonhufvud and the literature on disequilibrium macroeconomics was lost.

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