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## Getting rid of Keynes? A survey of the history of macroeconomics from Keynes to Lucas and beyond

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Getting rid of Keynes ?  
A survey of the history of macroeconomics  
from Keynes to Lucas and beyond



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by Michel De Vroey

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## **Abstract**

The aim of this paper is to recount the ebbs and flows of Keynesianism over the history of macroeconomics. The bulk of the paper consists of a discussion of the main episodes of the unfolding of macroeconomics (Keynesian macroeconomics, monetarism, new classical macroeconomics, real business cycle models and new neoclassical synthesis models) against the background of a distinction between Keynesianism as a 'moderately conservative' (Keynes's words) vision about the working of the market system and as a conceptual apparatus. Particular attention is given to the contrast between Keynesian and Lucasian macroeconomics. The paper ends with a few remarks about the impact of the present crisis on the development of macroeconomic theory.

Keywords: Keynes, Lucas, history of macroeconomics.

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The views expressed in this paper are those of the author and do not necessarily reflect the views of the National Bank of Belgium or those of the institutions to which he is affiliated.

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## **I. INTRODUCTION**

A fine way to make sense of the history of a given discipline is to bring out the milestones that marked its unfolding. When it comes to macroeconomics, the subject of this lecture, two such milestones spring to mind at once. The first is of course John Maynard Keynes's *The General Theory of Employment, Interest and Money* (1936). While Keynes's book was the fountainhead of the new discipline, the direction that it took was shaped by Hicks when he devised the IS-LM model. The second benchmark is the radical transformation that this discipline underwent in the late seventies and early eighties with the overthrowing of Keynesian macroeconomics and its replacement by what later became called dynamic stochastic general equilibrium (DSGE) macroeconomics, under Robert Lucas's leadership. My aim in this lecture is to recount these developments.<sup>1</sup>

My paper starts by looking back on the emergence of Keynesian macroeconomics and then goes on to explain its fall under Friedman's and Lucas's successive attacks. Next, I discuss the emergence of new classical macroeconomics, the first installment of the DSGE approach. I continue by assessing the eventually vain attempts of new Keynesian economists to refute Lucas's claims. The next episode I study is the real business cycle models initiated by Kydland and Prescott, which transformed the Lucasian qualitative style of modelling into a quantitative style. Finally, I shall broach a further transformation within the DSGE approach, models that are labelled either as new neoclassical synthesis or New Keynesian Phillips curve models.

These will be the main points dealt with in my lecture. However, I am aware that the question coming to the minds of an audience exposed to a lecture about the history of macroeconomics is that of the impact of the present crisis on its development. Unfortunately, this is a question which historians of theory cannot really answer (nor for that matter can other scholars). In my concluding remarks, I shall nonetheless make a few observations on this subject in the light of the observations presented in the course of my lecture.

Macroeconomics is a politically-laden field. This follows from its very object, the study of the ideal way of organising the working of the economy and the policies that need to be taken to this end. Two main views on this matter coexist: defence of what is called the 'free market', i.e. full economic liberalism, or a more moderate conception of economic liberalism, a view which supports the market system but admits to its possible failures and to the need for an active role of the government in remedying them. This second view is associated with Keynes, the former with Friedman, Lucas and his followers. Most people hold a firm standpoint on this divide. That is perfectly fine with me, except that I think economic historians of economics should be the exception here and refrain from taking sides. This is the methodological position that I shall adopt.

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<sup>1</sup> Other papers or books on the same topic are Blanchard (2000), Hoover (2003), Leijonhufvud (2006a), Snowdon and Vane (2005) and Woodford (1999).

## II. THE EMERGENCE OF KEYNESIAN MACROECONOMICS

The emergence of macroeconomics as a specific sub-discipline, and by the same token the emergence of Keynesian macroeconomics, was a three-step process. The first step was Keynes's *General Theory*, the second was the invention of the IS-LM model by John Hicks and its transformation by Franco Modigliani, the third the creation of macroeconometric models under the impulse, first, of Jan Tinbergen and, subsequently, of Lawrence Klein.

### *Keynes*

Keynes was already a towering figure in the economic profession as well as in the world of policy decision-making in the UK and internationally renowned before he wrote the *General Theory* but, beyond doubt, this book put him definitively in the pantheon of great economists. A versatile personality, Keynes was mainly a monetary economist. Although he had a good foothold among academics, his main activity was to be an expert on monetary matters advising the British government and international organisations, both formally and informally. But all along he pursued a theoretical purpose and the Great Depression pushed him further in this direction.

Without the Great Depression, *The General Theory of Employment, Interest and Money* (1936) would certainly not have seen the day. Keynes's aim when writing it was to elucidate the causes of the phenomenon of mass unemployment that affected all economies in those years and the policy measures that should be taken to solve the problem. This was a time of great disarray with no remedy at hand to fix the ailing economic system. Existing economic theory proved to be of little help both for understanding what was happening and indicating the measures to be taken. In most countries, the unemployment rate was soaring and deflationary policies had been met with failure. In contrast, market rationing had no room in economic theory. The notion of frictional unemployment had started to be evoked but it had no theoretical status. Its only policy prescription was that any decrease in real wages would be a good thing. So economic theory, Keynes realised, was blatantly wanting and needed to be reformed. He was hardly alone in believing this. A feeling of malaise was widespread in the profession. Academic economists were torn between their expertise and their instinct. According to economic theory, unemployment could only have been caused by excessively high real wages and cutting them was the remedy. Yet their instinct told them that this was untrue and that the remedy lay in state-induced demand activation. In Keynes's words:

A classical economist may sympathize with labor in refusing to accept a cut in its money-wage, and he will admit that it may not be wise to make it to meet conditions which are temporary; but scientific integrity forces him to declare that this refusal is, nevertheless, at the bottom of the trouble (1936, p.16).

Keynes's book, which was mainly addressed to his fellow economists, aimed at solving this deadlock by providing a theoretical basis for economists' gut feelings. The first task to be addressed, Keynes believed, was to fill the lacuna of the absence of a notion such as involuntary unemployment in

existing economic theory while it looked obvious in the context of the time that the mass of unemployed people had not chosen their fate. He also perceived that this phenomenon should be accounted for in general equilibrium terms (although he did not use the word). That is, involuntary unemployment might well be a labor market phenomenon but its origin had to be sought in other parts of the economy. Partial equilibrium analysis along Marshall's lines would not do. Finally, Keynes also wanted to exonerate wages from being the cause of involuntary unemployment, which implied that wage reductions could not be the remedy. His diagnosis as to the basic reason of the labor market failure was that it was due to a deficiency in aggregate demand, itself the result of insufficient investment. The remedy he proposed was a state-induced demand activation combined with a policy of low interest rates as well as some dose of income redistribution. To Keynes, all these measures hardly amounted to introducing socialism. On the contrary, their aim was to prevent it from arising and to preserve democratic capitalism.

To make his claim, Keynes developed a rich and subtle argumentation and introduced a series of new concepts in the lexicon of economic theory (effective demand, involuntary unemployment, preference for liquidity, marginal efficiency of capital, etc.). However, it must be admitted, for all Keynes's maestria, his reasoning remained obscure. Not only did he develop his argumentation at distinct levels of abstraction without bringing them together, but also many passages of his book were almost indecipherable. There are several reasons for this. Aiming at generalizing Marshallian theory was a totally new enterprise, and for that matter a daunting one, the achievement of which might have required long years of work without any guarantee of success. Keynes, in contrast, was driven by a sense of urgency. What mattered to him was to pave the way, and he was ready to leave the finishing job for others. Moreover, he was an extraordinarily gifted and inspired writer able to shift from technical argumentation to pure rhetoric. These factors, combined with the fact that there was a strong demand for a new theory of the kind Keynes proposed, explain why, despite its flaws, *The General Theory* got an enthusiastic reception especially among young economists. Dissatisfied with existing theory, they were crying out for a new theory that would justify getting away from the laissez-faire doctrine, and Keynes's work delivered on these two scores. Dissenting views, focusing on the shortcomings of Keynes's reasoning, were expressed but the pressure to produce a new theoretical framework that might account for the obvious dysfunctions in the market system was such that they were hardly listened to. Nevertheless, the perplexity as to the central message of Keynes's book was great, even amongst his admirers. The following extract from Samuelson is a fine testimony:

The *General Theory* caught most economists under the age of thirty-five with the unexpected violence of a disease first attacking and decimating an isolated tribe of South Sea Islanders. Economists beyond fifty turned out to be quite immune to ailment. With time, most economists in-between began to run the fever, often without knowing or admitting their condition. ... And I think I am giving away no secrets when I solemnly aver — upon the basis of vivid personal recollection — that no one else in Cambridge, Massachusetts, really knew what it was about for



some twelve to eighteen months after its publication. Indeed, until the mathematical models of Meade, Lange, Hicks and Harrod, there is reason to believe that Keynes himself did not truly understand his own analysis (Samuelson, 1964, pp. 315-6).

### The IS-LM model

As stated by Samuelson, the central message of the *General Theory* was clarified after a session of the Econometric Society Conference taking place in Oxford and which was devoted to the book. James Meade ([1937] 1947), R. F. Harrod (1937) and John Hicks ([1937] 1967) gave three distinct papers about it.<sup>2</sup> All three saw it as their first task to reconstruct the classical model in order to assess whether Keynes's claim that his model was more general than the classical was right. They all concluded against Keynes's claim. Their interpretations were also rather similar. The three papers were more than review articles, they offered a reconstruction of Keynes's insights that made them more easily understandable to economists while at the same time cutting off its most unorthodox edges. One of the papers presented at the Oxford Conference was promised to an extraordinary future, Hicks's piece, containing the first version of what was to become the IS-LM model. In order to compare Keynes's views with those of the 'classics', Hicks transformed Keynes's reasoning in prose into a simple system of simultaneous equations. He also thought up an ingenious way of allowing the combined outcome of three different markets to be represented in a single graph. The IS-LM model became the main benchmark in the development of macroeconomics, to the point that one wonders what would have become of the *General Theory* had Hicks's interpretation had not seen the light of day. Eventually, however, it is not Hicks's own model that became the workhorse of the new discipline but a model that resulted from Modigliani's recasting of it (Modigliani 1944).<sup>3</sup>

The third and final stage in the emergence of macroeconomics consisted of transforming qualitative models into empirically testable ones. An author who played an inaugural role in this respect is Jan Tinbergen. Like Keynes, he was a reformer, motivated by the will to understand the Great Depression and to develop policies that would impede its return. Tinbergen's League of Nations study of business fluctuations in the US from 1919 to 1932 (Tinbergen 1939) can be pinpointed as the first econometric model bearing on a whole economy. The main impulse, however, was due to Lawrence Klein. In his book, *The Keynesian Revolution* (Klein 1948), he commented that Keynes' concepts were crying out for a confrontation with the data. Implementing this idea became his lifelong task. His 1955 monograph co-authored with A. S. Goldberger (Klein and Goldberger 1955a), *An Econometric Model of the United States* (1955), introducing the celebrated Klein-Goldberger model, marked the start of a colossal line of works.

It was a 'medium size' model, and was truly intended (at the time) to be an up-to-date working model, applicable to practical economic problems like those encountered in business cycle

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<sup>2</sup> See Young (1987).

<sup>3</sup> Cf. De Vroey (2000).

forecasting. A distinctive feature of the model was that it was not viewed as a 'once-and-for-all' effort. It was presented as a part of a more continuous program in which new data, reformulations and extrapolations were constantly being studied. The model consisted of 15 structural equations, five identities and five tax-transfer auxiliary relationships. It was estimated by the limited information maximum likelihood technique and was based on the annual observations from the split sample period 1924-41, 1946-52 (Bodkin, et al. 1991, p. 57).

Several evolutions concurred to make this new development possible: the emergence of the IS-LM model on the theoretical side, new and more rigorous statistical estimation methods, the systematic construction of national data bases, the invention of new calculation methods eventually leading to emergence of computers. Klein took advantage of these innovations. He almost single-handedly created a new sub-discipline, macroeconomic modeling. For the first time, governments had at their disposition a quantitative macrodynamic model concerned with the economy as a whole that they could use to help the elaboration of their policy.

The high technicality involved in the construction of these successive generations of model should not hide their Keynesian nature. In effect, they rested on the unquestioned idea that excess supply was a recurrent feature of both the labor and the goods markets. In other words, they had a disequilibrium substratum.

#### *The heydays of Keynesian macroeconomics*

The 1950s, the 1960s and the first years of 1970s were the heydays of Keynesian macroeconomics. It seemed that, thanks to Keynesian precepts, business cycle fluctuations had been tamed to such an extent that many macroeconomists were not afraid to proclaim them a phenomenon of the past. On the theoretical front, the new scientific community of macroeconomics was thriving in unity around the Keynesian paradigm while the notion of a neoclassical synthesis, introduced by Paul Samuelson, served as a mantle enabling any deep conflicts between micro- and macroeconomists to be avoided. This notion effectively meant that each of these communities cultivates its own garden and economics will keep running smoothly. Intellectually, it meant that the concern of Keynesian theory was short-period disequilibrium phenomena while microeconomics was concerned with the long-period state of equilibrium to arise after adjustments have come to an end

This was also a time where the notion of Keynesianism or being a 'Keynesian' was unambiguous in its bringing together two possible meanings of the term. The first, more ideological (without giving a pejorative connotation to this term) refers to a vision as to how the economy ought to be organized — leaving the supremacy to market forces but having governments ready to act in an auxiliary way when market failures happen to arise. The second refers to the use of a precise conceptual apparatus, the IS-LM model, itself flowing from a Marshall-Keynes-Hicks lineage. Most, if not all, macroeconomists were Keynesians on these two scores. Presenting a framework that will enable me to capture the successive splits that will unfold later on, Table 1 summarizes this state of affairs.

Table 1. Characterizing Keynesian macroeconomics in terms of the Keynesian/non-Keynesian criterion

		Conceptual apparatus	
		<i>The Marshallian approach (the Marshall-Keynes-Hicks line)</i>	<i>The Walrasian approach</i>
<i>The policy viewpoint defended</i>	<i>Defense of demand activation</i>	– <b>Keynes's General Theory</b> – <b>IS-LM model</b>	
	<i>Defense of the free market</i>		

### III. THE FALL OF KEYNESIAN MACROECONOMICS

Keynesian theory always had its opponents but it took time for this opposition to be transformed in a powerful movement. The two names to be mentioned in this respect are those of Milton Friedman and Robert Lucas. Friedman criticized Keynesian policy conclusions while agreeing to reason in terms of the Keynesian methodology and conceptual apparatus. In contrast, Lucas led an all-out attack, bearing both on policy conclusion and method, which changed the course of macroeconomics.

#### Friedman

Friedman was a fierce opponent of Keynesian theory from the beginning of his intellectual career. Like Keynes, he developed his argumentation along two lines, sometimes addressing the wide public — as in his famous *Capitalism and Freedom* book — sometimes engaged in advanced academic work. Over the years, his status in the profession changed from that of an outlier, whose ideas were often mocked, to that of a highly respected scholar. Of all his papers, one of the most influential was his Presidential Address to the 1967 meeting of the American Economics Association (Friedman 1968) in which he proposed a re-interpretation of the Phillips curve, the so-called expectations-augmented Phillips curve model.

The Friedman address is a short text which, upon examination, can be judged as confused. Still, it marked a decisive point in the evolution of ideas. Whereas, on first reading, the criticism he advances seems to be modest and of limited scope — the conciliatory tone he adopts is not unrelated to this impression — in fact, it is devastating. Friedman's stroke of genius was to realize that the Phillips curve, which had become a cornerstone of Keynesian theory, could actually be used as a weapon against Keynesian policy recommendations, as much from the conceptual point of view as in terms of policy implications. The received view was that the Phillips curve was stable over time. This allowed Paul Samuelson and Robert Solow (1960) to point out that it offered a policy menu for governments, a trade-off between unemployment and inflation. Friedman claimed, first, that such a trade-off could exist only as a temporary the result of workers' misperception of the effects of monetary policy and, second, that any attempt to use the Phillips curve for implementing an inflation/unemployment trade-

off led to its displacement. From the policy viewpoint this amounted to an indictment of the more general view that governments could use monetary policy as a means to increase employment. Moreover, Friedman made his claim in the eve of the stagflation years, to the effect that these could be invoked as the demonstration of the accuracy of his views. This was a severe blow to Keynesian theory, and at the time Keynesian economists were at a loss to retort to Friedman’s attack.

However, Friedman’s contribution should not be viewed as a rejection of Keynes’ conceptual apparatus. Keynes and Friedman shared the same methodological viewpoint and a common sense of belonging to the Marshallian framework. Moreover, when requested to put his claim in a broader theoretical perspective, the model on which Friedman fell back was the IS-LM model (Friedman 1974). In short, Friedman should be considered as Keynesian from the methodological viewpoint and as anti-Keynesian from the policy viewpoint.

Table 2. Characterizing monetarism in terms of the Keynesian/non-Keynesian criterion

		Conceptual apparatus	
		<i>The Marshallian approach (the Marshall-Keynes-Hicks line)</i>	<i>The Walrasian approach</i>
<i>The policy viewpoint defended</i>	<i>Defense of demand activation</i>	– Keynes’s <i>General Theory</i> – IS-LM model	
	<i>Defense of the free market</i>	– <b>Monetarism (Friedman)</b>	

Lucas

Friedman’s anti-Keynesian offensive dealt exclusively with policy. His was an internal criticism led from within the Marshallian-Keynesian conceptual apparatus. This was no longer true for the subsequent attack led by Lucas and his associates. As an external criticism, Lucas’s attack led to a change that had all the hallmarks of a Kuhnian scientific revolution: a shift in the type of issues that are addressed, a new conceptual toolbox, new mathematical methods, the coming into power of a new generation of scholars, etc.

As in all scientific revolutions, the new approach combined a criticism of the previous and the emergence of a new direction of research. I will not go into detail on the former, but will simply mention two of Lucas’s main indictments. First, he argued against the aim of constructing a theory of involuntary unemployment on the ground of this notion’s elusiveness.<sup>4</sup> His second indictment, which

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<sup>4</sup> “Involuntary unemployment is not a fact or a phenomenon which it is the task of theorists to explain. It is, on the contrary, a theoretical construct which Keynes introduced in the hope it would be helpful in discovering a correct explanation for a genuine phenomenon: large-scale fluctuations in measured, total unemployment. Is it the task of modern theoretical economics to ‘explain’ the theoretical constructs of our predecessor, whether or not they have proved fruitful? I hope not, for a surer route to sterility could scarcely be imagined” (Lucas [1978] 1981, p. 243).

became known as the 'Lucas critique', pertained to the inability of Keynesian models to provide a robust basis on which to assess alternative economic policies due to their lack of microfoundations.

As for the new direction of research, the main change concerned the research agenda assigned to macroeconomics. In 1971, in his Presidential Address to the American Economic Association, James Tobin wrote that macroeconomics deprived of the full employment concept was unimaginable (1972, p. 1). But this is exactly what was about to happen. In the space of a few years, the unemployment theme — and in a wider sense the search for the malfunctioning of markets — ceased to be an important preoccupation of macroeconomists. It fell out of fashion, macroeconomists being glad to send it back to labor economists. At the top of the agenda we now have issues related to the business cycle and a wider spectrum of themes related to growth and development.

This went along with the introduction of a series of new concepts and methodological perspectives. They were not necessarily Lucas's invention — the obvious example is the notion of rational expectations, introduced by John Muth — nor was he the only person to bring them to the forefront, but he provided the impulse.

Keynesian theory explained variations in employment as resulting from changes in aggregate demand. The underlying picture is that labor suppliers are passive, employment decisions being made unilaterally by firms. Moreover, this theory considers the supply of labor, and the labor force as selfsame, taking for granted that any difference between the total labor force and the level of employment is involuntary unemployment. Lucas's claim (in a joint paper with Leonard Rapping, Lucas and Rapping 1969) was that supply of labor played as decisive a role as demand. His basic insight was that labor supply decisions ought to be studied not only as an arbitrage between leisure and participation in the labor market within a period of exchange but also as an intertemporal choice. That is, economic agents ought to be depicted as comparing the condition prevailing over the retribution of labor at one point in time with those they expect to prevail later in time, say today and tomorrow. If the former are more advantageous than the latter, they will decide to work more today and less tomorrow. This phenomenon, it is argued, is a clue for understanding variations in the level of activity over time, such variations then being viewed as grounded on optimizing behaviour.

Against this background and drawing from his renowned 1972 'Expectations and the Neutrality of Money' article (Lucas [1972] 1981), Lucas devised an equilibrium model of the business cycle (Lucas [1975] 1981). In this model, variations in employment are due to two factors: exogenous monetary shocks, on the one hand, and agents' imperfect information, on the other. Let me dwell on the latter factor. Agents face a single signal incorporating two distinct pieces of information, each of which would trigger an opposite reaction, changing or not changing the total hours worked, if available separately. Agents then face a signal extracting problem, which they solve by mixing the two opposite reactions in some weighted way. As a result, the hours worked will depart from what they would have been without

imperfect information. Here, Lucas claims, lies the explanation of the variations of employment over the business cycle.

A different vision of the business cycle ensues. Earlier, it was viewed as a disequilibrium phenomenon *par excellence*, the manifestation of a market failure. Lucas's account turns this view upside down. Now, the business cycle expresses the optimizing reactions of agents to outside shocks affecting the economy. In other words, the existence of business fluctuations should no longer be interpreted as market failures, and governments should refrain from trying to prevent their occurrence. Nor is there any rationale for acting upon them.

The change that occurred is clearly multifaceted — a change in the agenda, in the conceptual framework, in the mathematical tools used and in the vision of the business cycle. It also comprises a methodological dimension — first, the introduction of the microfoundations requirement and, second, a shift from a Marshallian towards a Walrasian perspective. I shall deal with these in turn.

Keynesian macroeconomics hardly bothered to make the microeconomic foundations of its aggregate variables explicit. To all intents and purposes, microeconomics and macroeconomics were considered two separate universes. This is a state of affairs that Lucas found unacceptable.<sup>5</sup> Macroeconomics ought to start with the description of how agents make their choices, these being made in an optimizing way. An objective function is to be maximized or minimized under given constraints. This microfoundations requirement is decreed to be the *sine qua non* of valid theoretical practice. Models that do not accord with it ought to be rejected.

The same requirement can be expressed differently as the 'equilibrium discipline'. It states that, to be valid, economic models should rest on two postulates: (a) that agents act in their own self-interest and their behavior is optimal; and (b) that markets clear (Lucas and Sargent [1979] 1994, p. 15). The 'discipline' term is used to convey the view that this is a rule that economists impose upon themselves, and which stamps their specific way of looking at social reality. Accepting such a standpoint results in proclaiming that the notion of disequilibrium, which was widely used before, should be banned from the economic lexicon.

Lucas's precept will look odd at first sight. To understand its rationale, two elements ought to be taken into account. First, it makes sense only when realizing that it was accompanied with a radical change in the meaning of the concept of equilibrium. In earlier times, from Adam Smith to Marshall and Keynes, the notion of equilibrium differed little from its common-sense understanding. It was viewed as a standstill position, a centre of gravity. The hallmark of equilibrium was the persistence of the same outcomes over time. The question raised about equilibrium was whether a given market or a given

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<sup>5</sup> "The most interesting recent developments in macroeconomic theory seem to me describable as the reincorporation of aggregative problems such as inflation and the business cycle within the general framework of 'microeconomic' theory. If these developments succeed, the term 'macroeconomic' will simply disappear from use and the modifier 'micro' will become superfluous. We will simply speak, as did Smith, Ricardo, Marshall and Walras of *economic theory*" (Lucas 1987: 107-108).

economy was in a state of equilibrium at a given point in time. Lucas's originality was to depart from this traditional conception by adhering to a conception of equilibrium where the model economy could be stated to be in equilibrium while displaying ever-changing outcomes over time. Moreover, and crucially, for Lucas, equilibrium is no longer a feature of reality. The following quotation, drawn from an interview with Brian Snowdon and Howard Vane, illustrates his viewpoint:

I think general discussions, especially by non-economists, of whether the system is in equilibrium or not are almost entirely nonsense. You can't look out of this window and ask whether New Orleans is in equilibrium. What does that mean? Equilibrium is a property of the way we look at things, not a property of reality. (Snowdon and Vane, 1998:127).

In other words, it is claimed that the ever presence of equilibrium is a feature of the model economy, the fictive economy created by the economist while constructing his model, but not a feature of reality.

From Adam Smith onwards, equilibrium has been a cornerstone of economic analysis. The distinct contribution of neoclassical theory has been to depict agents as behaving intelligently, i.e. in an optimizing manner. At a time when this premise was being questioned, Lucas proposed to take it even more seriously than before, the ground for this being its powerfulness, and he claimed to have made the point. Up to then, it had been taken for granted that the phenomenon of the business cycle was by nature a disequilibrium occurrence and that it would be impossible to account for it theoretically while assuming that at every point of the business cycle the assumption that agents were acting in an optimizing way. Lucas, and later Kydland and Prescott, proved the contrary. An equilibrium model of the business cycle, whose movements mimic those of reality, can be constructed. This shows that, instead of being a hindrance, the equilibrium discipline allows new breakthroughs.

I now turn to the second aspect, the replacement of Marshallian macroeconomics with Walrasian macroeconomics. In my recent book on the history of macroeconomics (De Vroey, 2009a), I claim that this is a central benchmark for understanding the transformation of macroeconomics triggered by Lucas. Keynesian macroeconomics ought to be considered as a simplified Marshallian general equilibrium theory. In contrast, Lucas's work belongs to the Walrasian approach. Different dimensions are involved and I cannot enter into them all here, except for one, which I find illuminative.<sup>6</sup> The transformation I have in mind can be summarized by stating that a shift occurred from ideas to demonstrations. The *General Theory* was a book full of ideas, often collapsing ones, several of which arcane. The result is that even now, seven decades after its publication, several books trying to reconstruct Keynes's thought are still being published every year, none of which has any chance of raising a consensus. That was the beginning of Keynesian macroeconomics. In contrast, new classical macroeconomics started with a twenty-page mathematical paper, Lucas's 'Expectations and the Neutrality of Money' article. It paved the way for a new research program without eliciting any hermeneutic discussions. Underlying this transformation from theory as a set of ideas to theory as

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<sup>6</sup> For a wider comparison, see De Vroey (2009b).

mathematical demonstrations lays another difference, recurrently underlined by Leijonhufvud.<sup>7</sup> Adopting a Marshallian perspective, as Keynes did, amounts to having the theoretical enterprise evolving at two levels of discourse, the theory and the model. A theory is a set of propositions about reality, aiming at uncovering the truth about it (in the way historians do). A model consists of a reasoning, that is usually mathematical but which can also proceed in prose, zeroing on a part of the theory with the aim of setting out the underlying mechanism at work in the most consistent way possible. In this vision, the model is clearly subservient to the theory. Again, we have here a startling contrast. Following Walras, Lucas states that the model and the theory are one and the same thing, the model now being limited to a mathematical reasoning, and possibly complemented with meta-theoretical comments. In this light, it is no longer claimed that a theory consists of propositions about reality. Its object of study is not reality but a fictive construction, a model economy. It is not claimed that the theory/model ought to be realistic. It cannot be so, because wanting to have a realistic model is an oxymoron. Still, according to Lucas, such a theoretical enterprise is far from gratuitous. The purpose of constructing such models is to have an array of analogical models helping to reflect on the efficiency of alternative policy measures.

To summarize, in this new perspective, the task at hand when doing macroeconomics is not to put ideas on paper, as Keynes did brilliantly, but to produce demonstrations and measurement. Any idea that cannot enter into the mathematical language ought to be left aside until further progress makes it possible.

I hope that these remarks have served the purpose of showing the contrast between the two generations of macroeconomic paradigms. Table 3 below summarizes its main elements. Instead of having two opposite conclusions drawn from broadly the same paradigm, as was the case with Friedman, we now obviously face two distinct paradigms.

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<sup>7</sup> See for example Leijonhufvud (2006b, p. 70).



Table 3. The contrast between Keynesian macroeconomics and new classical macroeconomics

	Keynesian macroeconomics	New classical macroeconomics <i>à la</i> Lucas
Top research priority	unemployment	business fluctuations
Core theoretical model	the IS-LM model	dynamic stochastic general equilibrium model
Relationship between micro and macro	neoclassical synthesis	equilibrium discipline
<u>Central concepts:</u> – expectations – studying the labor market  – main exchange framework	– adaptive expectations – emphasis on the demand for labor for explaining variations in employment – short-period analysis	– rational expectations – emphasis on the supply of labor for explaining variations in employment – intra- and intertemporal substitution
Wider basic approach	the Marshallian approach	the Walrasian approach

Finally, let me return to my taxonomy of macroeconomic theories against the Keynesian/non-Keynesian criterion. With Lucas, a new configuration arises, to be fully non-Keynesian, that is, both from the conceptual apparatus side and from the policy vision side. This is illustrated in table 4.

Table 4. Characterizing new classical macroeconomics in terms of the Keynesian/non-Keynesian criterion

		Conceptual apparatus	
		<i>The Marshallian approach (the Marshall-Keynes-Hicks line)</i>	<i>The Walrasian approach</i>
<i>The policy viewpoint defended</i>	<i>Defense of demand activation</i>	– Keynes's <i>General Theory</i> – IS-LM model	
	<i>Defense of the free market</i>	– Monetarism (Friedman)	– <b>New classical models <i>à la</i> Lucas</b>

#### IV. NEW KEYNESIAN MODELS, GENERATION ONE

Lucas's attack, often uttered in an aggressive language, led to two types of reactions from Keynesians. The first consisted in claiming that he had it all wrong. The following two quotations illustrate.

I argue ... that there was no anomaly, that the ascendancy of new classicism in academia was instead a triumph of *a priori* theorizing over empiricism, of intellectual aesthetics over observation and, in some measure, of conservative ideology over liberalism (Blinder [1988] 1997, p. 110).

To many Keynesians, the new classical program replaced messy truth by precise error (Lipsey 2000, p. 76).

Such assertions suggest that the direction opened by Lucas and fellow economists was to be radically rejected. In contrast, the other reaction amounted to admitting that many of Lucas's criticisms were founded and could not be dismissed with a sweep of the hand. This attitude was the hallmark of so-called 'new Keynesian' economists. While wanting to re-habilitate Keynes's insights, they agreed to wage their counter-offensive on Lucas's turf, i.e. to respect the micro-foundations requirement. However, new Keynesian economics was far from being a unified approach. Let me just mention a few of the lines of research taken. Some new Keynesian models —such as efficiency wages models (e.g. Shapiro and Stiglitz (1984)) — made it their priority to demonstrate the equilibrium existence of involuntary unemployment. Others — in particular coordination failures models (e.g. Diamond ([1982] 1991)) — concerned themselves with the less ambitious aim of demonstrating underemployment in a multiple equilibria framework. Thereby, they were able to exonerate wage rigidity as a cause of the phenomenon and to vindicate demand activation. Some other authors (e.g. Hart ([1982] 1991), Blanchard and Kiyotaki ([1987] 1991)), also concerned with underemployment, adopted an imperfectly competitive framework. This framework was also adopted by Fischer ([1977] 1991) and Taylor ([1979] 1991) who conceived staggering contract models in order to rebut Friedman's and Lucas's claim about the ineffectiveness of monetary policy. Table 5 shows how some of these models enter my taxonomy. The reader will observe that the emergence of imperfect competition models prompts the need for an enlargement of my taxonomy, a new sub-category within the Marshallian approach being introduced. The striking point is that these models are Keynesian as far as policy is concerned but are non-Keynesian as regards the conceptual apparatus criterion.

Table 5. Characterizing new Keynesian macroeconomics in terms of the Keynesian/non-Keynesian criterion

		<i>Conceptual apparatus</i>		
		<i>Marshallian approach</i>		<i>Walrasian approach</i>
		<i>The Marshall-Keynes-Hicks line</i>	<i>The Marshall-Chamberlin line</i>	
<i>Policy viewpoint</i>	<i>Defense of demand activation</i>	– Keynes – IS-LM model	<b>– New Keynesian models of the imperfect competition type</b>	<b>– New Keynesian models of the coordination failures type</b>
	<i>Defense of the free market</i>	– Monetarism (Friedman)		– New classical macro (Lucas)

New Keynesian economists have succeeded in their retort to Lucas's attack in that they constructed models giving an equilibrium foundation to involuntary unemployment or unemployment. Nonetheless, after a period of fierce debates, they grew tired of engaging in an uphill struggle. On the one hand, the

emergence of search and matching models vindicated Lucas's claim that the topic of unemployment could be sent back to labor economists instead of remaining at the center of macroeconomics. On the other, most of the new Keynesian models were framed in a static framework while the dynamic stochastic perspective had become the compelling way of modeling. Gradually, new Keynesians realized that they needed to enter into the new language if they wanted to have an effect on the unfolding of macroeconomics.

## **V. REAL BUSINESS CYCLE MACROECONOMICS**

In his "Methods and problems in business cycle theory" paper, Lucas ([1980] 1981, p. 288) stated that the task ahead was to write a FORTRAN program. As he wrote in a related paper, the macroeconomist's aim must be to construct "a fully articulate artificial economy which behaves through time so as to imitate closely the time series behavior of actual economies" (Lucas [1977] 1981, p. 219). However, Lucas himself contributed little to this enterprise. In contrast, Kydland and Prescott took Lucas's injunction literally and devoted themselves to the task of transforming a qualitative type of modeling into a quantitative one.

The aim of Kydland and Prescott's "Time to Build and Aggregate Fluctuations" model (Kydland and Prescott 1982) was to show that economic fluctuations could be explained as the result of economic agents' optimizing adjustment to exogenous technological shocks. Their model adopted most of the distinctive features of Lucas's model — in particular, the equilibrium discipline, rational expectations, the Lucasian supply function — but abandoned the idea that the shock was monetary as well as the assumption of imperfect information. To this end, they construct the most rudimentary model conceivable of an economy comprising a large number of identical infinitely-lived agents. This allows the analysis to be undertaken in terms of a representative agent shouldering both the functions of capitalist and wage-earner.

Kydland and Prescott's starting point was Ramsey's (1928) and Cass's (1965) models of optimal growth, which was extended to the case of a stochastic economy by Brock and Mirman (1972). They also characterized their model economy with stochastic auto-correlated shocks. A positive shock leads the representative agent to increase investment, which in turn leads to a decrease in leisure and an increased labor supply. Finally, they wanted to make their model empirical, in spite of its Robinson Crusoe nature, by confronting its results with real-world data. The field of application chosen was the evolution of the US economy from 1950 to 1975.

I cannot enter into a detailed description of their model and the several technical steps required for making it empirical, which proved to be a titanic task.<sup>8</sup> Its validation occurs by comparing the moments (volatility, correlation and auto-correlation) that summarize the actual experience of the US economy

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<sup>8</sup> To get a taste of what it involved, the reader unacquainted with the nuts and bolts of constructing real business cycle models can turn to Prescott's Nobel lecture (Prescott 2006).

with similar moments obtained from simulating the model economy. The model succeeds if the simulation mimics the empirical observations. To a large extent and somewhat surprisingly, this was the case with the Kydland and Prescott model. Taking the fluctuations of output as a reference, the model satisfactorily reproduced both the lower variability of consumption and the higher variability of investment. The same is true for the pro-cyclicality and persistence of most of the variables considered.

Merely asserting that qualitative modeling gave way to quantitative modeling fails to convey the full measure of the change that took place. Behind this contrast lies another, more sociological, difference. To introduce it, let me remark that, in a certain way, the relationship between Lucas and Kydland and Prescott replicates that between Keynes and his followers. Earlier, I raised the question of what would have happened to the *General Theory* if its message had not been transposed into the IS-LM model, and if Klein had not extended this model into an econometric framework? The same conundrum arises over the relationship between Lucas, on the one hand, and Kydland and Prescott, on the other. Without Kydland and Prescott, would the seismic change that macroeconomics underwent have occurred? It is far from sure. Lucas's conceptual papers were impressive but too highbrow to generate a huge following. As for Lucas's criticism, its impact on the profession could have been limited to making modelers more cautious when drawing conclusions from their models, and not actually produced any radical change in method. To have a scientific revolution, an alternative way of doing applied work, providing new grist to the mill for the majority of members of the community, must be made available. This was Kydland and Prescott's main contribution as they were able to set the agenda of macroeconomics. While their model was initially met with skepticism, it eventually became the workhorse of macroeconomic modeling. A large fraction, if not the majority, of the macroeconomic community started working in the direction set out by Kydland and Prescott. As a result, many improvements on the founding model were made, which I cannot detail here.

A question worth raising about real business cycle modeling pertains to its scope of relevance. Lucas has recurrently claimed that such models were apt to tackle normal business fluctuations but fell short of explaining a phenomenon such as the Great Depression. After having shared this viewpoint, Prescott changed his mind and argued that the real business cycle methodology was able to come to grips with great depressions — quite a bold claim when one recalls that such models are based on the premises of optimizing behavior and market clearing.

Turning to the characterization of real business cycle models in my taxonomy, real business cycle models ought to be put in the same spot as new classical models. They are fully non-Keynesian, both from the policy and the conceptual aspects.

Table 6. Characterizing real business cycle models in terms of the Keynesian/non-Keynesian criterion

		<i>Conceptual apparatus</i>		
		<i>Marshallian approach</i>		<i>Walrasian approach</i>
		<i>The Marshall-Keynes-Hicks line</i>	<i>The Marshall-Chamberlin line</i>	
<i>Policy viewpoint</i>	<i>Defense of demand activation</i>	– Keynes – IS-LM model	– New Keynesian models of the imperfect competition type	– New Keynesian models of the coordination failures type
	<i>Defense of the free market</i>	– Monetarism (Friedman)		– New classical macro (Lucas) – <b>Real Business Cycle models</b>

Finally, since I have recounted the drifting away from Keynesian theory that started with Friedman and culminated with real business cycle models, it may be useful to briefly characterize the evolution that took place. Table 7 does this job. It emphasizes that while Friedman started the whole process, at the end of the day, little, except the policy viewpoint defended, is left of Friedman's own way of posing issues.

Table 7. The evolution in approach from Friedman's expectations-augmented Phillips Curve model to Lucas's and Kydland and Prescott's models

	Friedman (1968)	Lucas (1972)	Lucas (1975, 1976)	Kydland and Prescott (1982)
Purpose	Demonstrating the inefficiency of monetary policy	Demonstrating the inefficiency of monetary policy	Constructing an equilibrium theory of the business cycle	Constructing an equilibrium theory of the business cycle
Theoretical project	Marshallian	Walrasian	Walrasian	Walrasian
<u>Main assumptions</u>				
(a) the nature of the shock	monetary	monetary and real	monetary and real	real
(b) expectations	adaptive	rational	rational	rational
(c) allocative mechanism	intra-temporal	inter-temporal	inter-temporal	inter-temporal
(d) information	imperfect	imperfect	imperfect	perfect

## **VI. THE NEW NEOCLASSICAL SYNTHESIS AND NEW KEYNESIAN MODELS, GENERATION TWO**

Of course, real business cycle models are not the final stage of macroeconomics. Gradually, new models emerged at the end of the 1990s marking a significant departure from the earlier framework. However, this change should not be viewed as a revolution overthrowing the earlier paradigm that Lucas's work generated. Rather, it constituted an endogenous evolution in which the two theoretical streams that had previously been fighting each other, new Keynesians and real-business cycle theorists, came to terms about adopting a single model as the common ground for further theoretical discussions. Interestingly enough, two rival names were proposed for it, 'new neoclassical synthesis models' (Goodfriend and King 1997) and New Keynesian Phillips curve models (Clarida, Gali and Gertler 1999). Whatever the label, these models borrow their ingredients both from the real business cycle and the new Keynesian tool boxes. From the former, they draw the view that macroeconomics is concerned with the study of the dynamic evolution of the economy in a stochastic context, and ought to be based on microfoundations, rational expectations and intertemporal substitution. From the second, they inherit imperfections — imperfect competition, on the one hand, and sluggish prices and wages on the other — with pride of place being given to monetary policy.

The base camp of the new approach is the Dixit-Stiglitz monopolistic competition model (Dixit-Stiglitz 1977). This is a model where firms are able to control the price of their goods, which they fix by adding a mark-up on their marginal costs. Whenever, for one or another reason, they are unable to adjust their price in the face of an increase in demand, it is in their interest to expand the quantity of goods supplied up to the point of satisfying full demand. The Dixit-Stiglitz model is further enriched by making it twice imperfect, i.e. by combining a real imperfection (imperfect competition) with a nominal imperfection (sticky prices). The latter is obtained either by resorting to staggering wage-setting along the lines of Taylor (1979) or to price-setting like Calvo (1983), where it is assumed that at each period only a given proportion of all firms are able to change their prices.

The issue of the real effects of monetary policy, the very topic that Friedman and Lucas had declared to have settled once and for all, has now been re-opened with new conclusions. First, it turns out that monetary policy actions can have an important effect on real economic activity, persisting over several years, due to the gradual adjustment of individual prices and the general price level. Second, even in settings with costly price adjustment, the model leads to some long-run trade-off between inflation and real activity. Third, significant gains are obtained from eliminating inflation. They stem from increased transactions efficiency and reduced relative price distortions. Fourth and finally, credibility plays an important role in understanding the effects of monetary policy (Goodfriend and King 1997: 232).

It is still too early to assess the future of this line of thought. One of its interesting points with respect to the benchmarks I use to study the development of macroeconomics is that it witnesses a move away from the Walrasian approach and a return to a Marshallian perspective. As for my taxonomy, the result

of the methodological consensus between new Keynesians and defenders of free market solutions is the same model that now appears in two different slots of my table.

Table 8. Characterizing new neoclassical synthesis models in terms of the Keynesian/non-Keynesian criterion

		<i>Conceptual apparatus</i>		
		<i>Marshallian approach</i>		<i>Walrasian approach</i>
		<i>The Marshall-Keynes-Hicks line</i>	<i>The Marshall-Chamberlin line</i>	
<i>Policy viewpoint</i>	<i>Defense of demand activation</i>	– Keynes – IS-LM model	– New Keynesian models of the imperfect competition type – <b>New neoclassical synthesis models</b>	– New Keynesian models of the coordination failures type
	<i>Defense of the free market</i>	– Monetarism (Friedman)	– <b>New neoclassical synthesis models</b>	– New classical macro (Lucas) – Real Business Cycle models

## VII. CONCLUDING REMARKS: THE IMPACT OF THE 2008-9 FINANCIAL CRISIS ON MACROECONOMIC THEORY

The issue of the impact of the Great Recession on the development of macroeconomics ought to be broken down into two distinct questions. The first is whether this event raises a challenge to macroeconomic theory as it stood when the crisis was about to break out. The second, is whether the course of development of the discipline may change consequently to the crisis.

As regards the first question, many commentators have blamed macroeconomics for not having predicted the outbreak of the crisis but, to me, the discussion should rather bear on the ability of present-day macroeconomic theory to come to grips with it. Here, the diagnosis tilts towards the negative. Two factors explain this. The first one, upon which I shall not expand, is that the strategy adopted in DSGE models is one of constructing simple models — a defensible strategy when tractability is taken into account. As a result, little attention has been given to the financial sector, which played a crucial role in the recession.

The second factor pertains to the limits of what can be done with an equilibrium model, that is, models premised on the view that, whatever the situation in which economic agents find themselves (in the model economy), they should be considered as having achieved their optimizing plan. In other words, DSGE models exclude in advance the possibility of any pathology in the working of the market system, and certainly of any collapse in the trading system of the extent that we have known.<sup>9</sup>

<sup>9</sup> Imperfect competition could be labeled a pathological case but it involves no obstacles towards the attainment of equilibrium.

Not that a real business cycle theorist is unable to recast the crisis in the language of his model. The story he could tell is as follows.<sup>10</sup> An exogenous shock, occurring in the financial sector, affects the economy. As a reaction, households fear future high taxes which will be necessary to compensate the bailing out of the banking system by the State. Because of this fear, business, in particular small business, will cut investment and take more cash out of the business sector. Employment will fall because of a shift in both the demand for and the supply of labor. Households will cut their durable consumption. This should account for the drop in activity. As far as the nature of the shock is concerned, it is viewed as a government failure, the addition of two mistakes. The first, which goes back to Clinton's presidency, is the US government's political pressure on state-controlled mortgage companies to extend mortgages to households that could not afford them. The second, is the Fed's low interest rate policy. Even if there may be some truth in these observations, the main point lies in what this scenario discards, the possibility that markets can fail and that agents may find themselves in a state where they are unable to achieve their optimizing plan. When the economy is in a plain sailing state, this neglect is admissible but it is no longer so when the economy shows signs of erring. As a result, the present-day state of macroeconomics resembles that which Keynes faced: existing theory excludes systemic market failures and involuntary outcomes while everything indicates that the contrary is true in reality. Whatever the virtues of the real business cycle methodology, its limits become blatant. So, it can rather safely be concluded that the Great Recession presents a strong challenge to present macroeconomic theory.

However, no straightforward answer can be given to the question asking in which direction a change will occur. For lack of time, I shall limit myself to making two remarks. The first is that future developments in macroeconomics are an open matter because they depend on theoretical innovations led by scholars, the next Keynes, Lucas, Kydland and Prescott, blazing new directions of research. A race for theoretical innovation is open into which many contenders will enter. But, at this juncture, it is difficult to fathom which lines will be taken (and prove feasible) although it may be guessed that a basic aim will be to introduce more market failures into the picture.

My second remark is that the crisis has resulted in a shift in visibility between the defenders of the free market and economists with a Keynesian inclination in the policy vision sense. The former are now on the defensive and the latter are cheering up after two decades of gloom. Nonetheless, to get the right perspective, a distinction must be drawn between what is going on in the sphere of media and meta-theoretical essays, on the one hand, and in the academic world, on the other. Two prominent defenders of Keynes are Lord Skidelsky, Keynes's biographer and the recent author of *The Return of the Master* (Skidelsky 2009), and Paul Krugman, the 2008 Nobel-prize laureate (see for example Krugman 2010). They share the same simple message: one should return to Keynes! In Krugman's words, "Keynesian economics remains the best framework we have for making sense of recessions and depressions" (2010, p. 8). My distinction between Keynesianism as a policy vision and as a

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<sup>10</sup> This is the story that Prescott told at a conference given in Paris in July 2009 (Prescott 2009).



conceptual apparatus is useful here. Krugman and Skidelsky take up the earlier viewpoint, peculiar to the era of Keynesian macroeconomics, that these two aspects are intertwined. I disagree with them. While I think that we shall witness a revival of the Keynesian motivation of bringing out market failures, I doubt that any return to the Keynesian conceptual apparatus will occur. First, claiming that one should return to a theory that was proposed more than seventy years ago amounts to assuming that no progress has been made in between, and that the methodological choices that offered themselves at that time are still worth considering today. On the contrary, I think that the criticisms that Lucas made about Keynesian theory were well taken, and that his positive contributions, as well as those of Kydland and Prescott and the many economists who treated their footsteps, will not be written off, even if they are overtaken. Second, as mentioned above, the transformation that took place in macroeconomics took the form of a replacement of mere exchanges of ideas about reality by the requirement to demonstrate propositions pertaining to a model economy (or, in other words, the conflation of the notions of theory and model). I believe that there will be no return on this state of affairs. Any dilemma between the tractability constraint and the real-world direct relevance constraint will be solved in favor of the former. Therefore, in my opinion, Krugman's and Skidelsky's injunctions will have little impact on academic work.

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