

ARTICLE

MACROECONOMICS – DEVELOPMENTS AND MODERN TRENDS

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The economic history of most countries is a story of economies out of equilibrium. Aalborg University Professor Finn Olesen suggests combining the approach of post-Keynesian economics with the core elements of behavioural economics could challenge the dominance of modern mainstream macroeconomic understanding more thoroughly than ever before.

INTRODUCTION

The birth of modern macroeconomics is normally linked to the publication of John Maynard Keynes's *The General Theory* in February 1936. In the book, Keynes criticised the mainstream understanding of his time both theoretically and methodologically.

For Keynes, the classical theory only addressed macroeconomic outcomes of perfection; given the strength of the market mechanism – operating efficiently through changes in relative price relationships – every single market would provide an optimal equilibrium solution, thus making the goal of macroeconomics to be one of full employment. As per the validity of Say's Law, a given aggregated supply would always create a matching aggregated demand. As such, unemployment could only be voluntary. However, Keynes argued that this result had been thoroughly falsified by empirical evidence – indeed, 'real life' was not characterised by harmony and prosperity for the majority of those living in the 1920s and early 1930s.

For Keynes, the classical theory only addressed a special case – full employment. As he argued in *The General Theory*:

I shall argue that the postulates of the classical theory are applicable to a special case only and not to the general case... there would obviously be a natural tendency towards the optimum employment of resources in a society which was functioning after the manner of the classical postulates. It may well be that the classical theory represents the way in which we should like our economy to behave. But to assume that it actually does so is to assume our difficulties away.¹

Keynes aimed to provide the more general theory that economics so urgently required. He claimed that he could address problems of optimality and equilibrium (the classical case) and disequilibrium outcomes, whether in recessions or booms. As has been widely established, *The General Theory* paved the way for the Keynesian Revolution in economics that dominated macroeconomics for decades.

Methodologically, Keynes argued that the classical theory accepted a type of determinism not found in real life. As later termed by Paul Davidson,² Keynes' view on economics was non-ergodic due to the system being open, socially determined, path-dependent and changeable. As such, Keynes opposed the ergodic methodology of the classical theory – real life is not repetitive. The economic behaviour of households and firms are not hinged only on prices (and changes to these) as the only salient variable. Indeed, when households and firms plan, decide and act, they incorporate a wealth of relevant information further to prices. However, although Keynes succeeded in laying the foundations for a new theoretical economic paradigm, his methodological messages in *The General Theory* became somehow forgotten for many years. Generally speaking, only post-Keynesian

scholars have tended to acknowledge the genuine importance of Keynes's new and alternative methodology.

However dominant the Keynesian paradigm became for the decades following the Second World War, some questioned the relevance of its interpretation (known as the Neoclassical Synthesis) with which most macroeconomists agreed. In particular, post-Keynesians argued that this interpretation was too theoretically classical and lacked Keynes's methodological understanding. Others – the proponents of the Neoclassical Synthesis – argued that they had improved the messages of *The General Theory*. According to them, Keynes only concerned himself with economic recessions – i.e., special cases where aggregated demand was below the level of aggregated supply due to (wage) inflexibility – whereas the Neoclassical Synthesis provided a more general macroeconomic framework. Still others, such as adherents to the Chicago school of economics, argued that Keynesianism should be replaced by a more old-classical-like understanding. The market mechanism could be made so strong and effectively present in the economy that economic policy changes were not needed to equilibrate aggregated demand and supply.

Accordingly, while the Keynesian paradigm took centre stage for several decades, one could not argue that there was only ever one school of macroeconomics present in academia. In this respect at least, macroeconomics has historically had certain pluralist characteristics. Furthermore, the history of macroeconomic thought suggests that the content of this perceived mainstream macroeconomic theory has changed continuously ever since the initial publication of *The General Theory* to the present day.

Through this article, I seek to provide a selected presentation of macroeconomic history from 1936 and onwards, as well as to highlight why and how

1. Keynes, 1936, pp. 3 and 33–34

2. Davidson, 2016

the NNS has, in contemporary society, become the dominant method with which to analyse macroeconomic phenomena. Furthermore, the article aims to present two alternatives that may possibly challenge this dominance.

FROM KEYNES TO THE NEOCLASSICAL SYNTHESIS

In 1937, John Hicks published his interpretation of what should be seen as *The General Theory's* core theoretical core statement. Hicks perceived this as the rejection of the classical dichotomy. Keynes argued that financial and real economic activity crucially interact with one another. Therefore, the demand for money had to be explained by liquidity preference rather than the (for Keynes) outdated classical quantity theory. That is, the demand for money changed from $MD(Y)$ to $MD(Y,r)$. Keynes proposed that this demand was determined by three motives: for transaction, for precaution, and for speculation. In contrast, the original quantity theory of money included only the transaction motive. If needed, monetary policy could increase the level of aggregate demand through lower interest rates stimulating investment decisions, thereby leading the macroeconomic output closer to one of full employment. As such, Hicks³ fundamentally changed macroeconomics with his IS/LM model which still today is a core model in basic macroeconomic teaching.

Almost a decade later – see, especially, Modigliani⁴ – building on the IS/LM model, combined with a labour market with sticky wages, a consensus among macroeconomists changed the interpretation of Keynes. His 1936 theory should not be regarded as general, but rather as one fixated upon a specific economic situation. It portrayed economies hit hard by a recession. However, a prolonged

economic recession that lasted for years should not be explained by a lack of effective demand, but instead by wage inflexibility:

It is usually considered as one of the most important achievements of the Keynesian theory that it explains the consistency of economic equilibrium with the presence of involuntary unemployment... this result is due entirely to the assumption of 'rigid wages'.⁵

This interpretation was termed the Neoclassical Synthesis, which came to be the dominant representation of Keynesian theory for decades.⁶

MILTON FRIEDMAN: FREE THE MARKET MECHANISM

Generally speaking, while Keynesianism dominated both the development of macroeconomic theory and the perception of how to conduct economic policy for decades after the Second World War, not all economists adhered to this school of thought. In particular, those part of the Chicago school of economics advocated an alternative. With their classical view on economics, they proposed a more market-based approach. Fundamentally, they argued that the market mechanism is both strong and highly effective if allowed to function freely, thus not requiring the 'stop and go' policies of the Keynesians. The battles between supply and demand are sufficient in themselves; together they can deliver both efficiency and optimality in every market. Such a battle would consequently lead to the macroeconomic outcome of full employment.

For many years, Milton Friedman was one of the most famous Chicago economists. He essentially paved the way for not only a period of Monetarism but, more importantly, also the later emergence of the New Classical theory of macroeconomics.

3. Hicks, 1937

4. Modigliani, 1944

5. Modigliani, 1944, p. 65

6. However dominant the Neoclassical Synthesis may have been, it was not the only interpretation of Keynes. Indeed, suffice it to mention the post-Keynesians (who saw themselves as his only true successors) and the school of disequilibrium economics; see Clower (1965), Barro and Grossmann (1971), Malinvaud (1977, 1980), and Muelbauer and Portes (1978). The post-Keynesian understanding will be presented later in the article.

As such, Friedman should be seen as a forerunner to Robert E. Lucas, and one of the most influential economists of his generation. Indeed, Palley⁷ recognised that Friedman:

...influenced both the economics profession and the general public, pushing all to adopt more pro-market, pro-business, anti-government view of the world... [as such, he] ... in part reflects the political and social forces that made neoliberalism the dominant global doctrine after 1980. It is also testament to Friedman's rhetorical powers. Powerful political forces created the neoliberal wave, but Friedman both rode that wave and contributed to it ... [thereby having the effect that] ... his triumph has taken economic understanding back in a pre-Keynesian direction.⁸

For Friedman, monetary policy had one, and only one, task to perform: achieving a low and stable inflation rate. If successful, such an outcome would minimise the sum of economic failures made by firms and household, thereby optimising the economy and ensuring the macroeconomic output to be as close as possible to full employment. One had to allow the allocative strength of the market mechanism to work as freely as possible. He thus proposed that economic policy intervention would generally do more harm than good.⁹

In December 1967, Friedman presented his Presidential Address to the American Economic Association (AEA),¹⁰ which may well be one of the most widely read speeches in AEA history.¹¹ In his address, Friedman highlighted what he saw as the

fundamental tasks of monetary policy. It can give stability to the economy by focusing on achieving low inflation. To achieve this goal, monetary policy should be based on rules rather than, as the Keynesians argued, continuous changes – i.e., the 'stop and go' policy strategy arising from cyclical GDP fluctuations. For Friedman, the Keynesian task was futile as monetary policy 'cannot use its control over nominal quantities to peg a real quantity – the real rate of interest, the rate of unemployment, the level of real national income'.¹²

Conversely, Friedman regarded rightly conducted monetary policy as rather effective, as 'it is a matter of record that periods of relative stability in the rate of monetary growth have also been periods of relative stability in economic activity'.¹³

Focusing on inflation, Friedman (1968) famously established the framework of the expectations augmented Phillips curve.¹⁴ One must remember that firms and households act economically on price expectations, which may change over time. Therefore, households are concerned about the level of their real wage as they do understand the difference between nominal and real variables. If they expect the price level to rise in the future, they will demand a higher nominal wage. Moreover, the wage-setting process on the labour market is determined by the demand and supply of labour, and the level of unemployment:

At any moment of time, there is some level of unemployment which has the property that it is consistent with equilibrium in the structure of real wages rates. At that level of unemployment, real wage rates are

7. Palley, 2014, pp. 28 and 35

8. Ibid.

9. Laidler (2005, p. 16) characterised the essence of Friedman's economic understanding: 'markets were stable and capable of dealing efficiently with allocative challenges. If they failed to meet them, this was not because they were inherently flawed, but because misconceived monetary policies had been visited upon them'.

10. Published as Friedman, 1968

11. Laidler stated that 'Friedman's address turned out to convey not just a message for its own time, but also one that would evolve and reverberate for long enough to make it instructive reading even today' (2018, p. 444).

12. Friedman, 1968, p. 11

13. Ibid., p. 15

14. This framework was first presented by Samuelson and Solow (1960). See also the seminal contributions by Phelps (1967, 1968)

tending on the average to rise at a 'normal' secular rate... A lower level of unemployment is an indication that there is an excess demand for labor that will produce upward pressure on real wage rates. A higher level of unemployment is an indication that there is an excess supply of labor that will produce downward pressure on real wage rates.¹⁵

Friedman termed the level of unemployment consistent with labour market equilibrium as the natural level of unemployment.¹⁶ The closer the labour operates around this level of unemployment, the greater the economy's stability. Relatively small changes in nominal wages ensure minimal adjustment in firms' labour costs, thus giving them little incentive to change their price setting procedures. In such a state, the economy tends to operate close to the level of full employment. Accordingly, it is crucial to stabilise how people perceive future price changes. Moreover, stability in price expectations can be ensured by the correct conduct of monetary policy. Therefore, monetary policy must be rule based, and not subject to short-sighted strategies (with long-term focuses preferred). This is the essence of Friedman's view on monetary policy.

As such, Friedman's Presidential Address heralded an upcoming economic revolution. Indeed, his 1967 speech to the AEA was possibly more impactful than he himself realised at the time. As Storm¹⁷ wrote:

Friedman's address holds an almost mythical status as the harbinger of a building revolution in macroeconomic thinking: the supply-side

revolution centred on the rejection of a Phillips-curve inflation-unemployment trade-off in the long run that swept the profession at the end of the 1970s.¹⁸

ROBERT E. LUCAS: THE FOUNDING FATHER OF THE RBC

In 1976, Robert E. Lucas presented his famous 'Lucas critique', which seriously questioned the status of much contemporary macroeconomic thought. He criticised how Keynesians built macroeconometric models and that their policy analyses tended to conflict with general equilibrium theory. He argued that future questions concerning economic policy ought to focus on alternative policy rules 'which allowed individual agents to formulate forward-looking dynamic optimization problems'¹⁹ within a general equilibrium framework.

As such, Lucas²⁰ became tremendously influential in terms of how to build macroeconometric models and evaluate economic policies. To many, this seminal paper was the first of several contributions which finally led to the real business-cycle (RBC) theory in modern macroeconomics. RBCs became synonymous with New Classical thinking, and remain a core element of modern mainstream macroeconomics to this day – commonly referred to as NNS.²¹

Furthermore, with his rational expectations revolution, Lucas laid the foundation for mainstream macroeconomic methodology. Most economists argue that, after Lucas, macroeconomics can only be conducted within an equilibrium framework with intertemporal optimising households and

15. Friedman, 1968, p. 8

16. Contrary to many interpretations of Friedman (1968), this level of unemployment is not uniquely given, as he himself indicated. Rather, it is determined by many factors: 'the actual structural characteristics of the labor and commodity markets, including market imperfection, stochastic variability in demands and suppliers, the cost of gathering information about job vacancies and labor availabilities, the costs of mobility, and so on' (Friedman, 1968).

17. Storm, 2018

18. Ibid., p. 517

19. Rudebusch, 2005, p. 246

20. Lucas, 1976

21. An importance that Lucas himself seems to acknowledge: 'This "Lucas critique" ... is probably the most influential paper I have written' (2001, p. 291).

firms using rational expectations. As such, not only should macroeconomics rest upon explicit microeconomic axioms; macroeconomic theory must also be formulated exclusively through mathematical modelling. Indeed, as Lucas himself stated:

I came to the position that mathematical analysis is not one of many ways of doing economic theory: It is the only way. Economic theory is mathematical analysis. Everything else is just pictures and talk... It is a method to help us get to new levels of understanding of the ways things work.²²

Moreover, Lucas narrowed the focus of macroeconomic analysis to supply side effects only. He considered demand side effects – i.e., shocks of an exogenous nature – to be generally unable to affect the macroeconomic outcome.

Stated differently, macroeconomics must be applied based on an intertemporal general equilibrium understanding with optimising agents using rational expectations. Households and firms therefore use their intellectual capacity to understand how the economy works in order to most efficiently exploit all of the relevant information available. That is, they act with the same knowledge about the economy as that of the modelmaker, leading their expectations to be model-consistent. With this kind of behaviour, macroeconomics is essentially transformed into microeconomics as both types of behaviour become highly similar – the representative agent pursuing optimality and the policymaker seeking to minimise a social-loss function.

Lucas argued that one must have 'a disciplined way of establishing the connection between particular policy actions and their consequences for resource allocation and individual welfare'.²³ That is, one must use a welfare criterion when having to decide between different policy proposals. In principle, '... an efficient monetary/fiscal authority will choose a history-contingent sequence of income tax rates and money growth rates (inflation tax rates) so as to maximize the expected discounted utility of the typical consumer'.²⁴

Following such a policy strategy, 'we obtain a method for evaluating policies that has comprehensible units and is built up from individual preferences'.²⁵ With this kind of strategy, together with the acceptance of the representative agent, the macroeconomic analysis transforms into a microeconomic analysis.

Furthermore, if economic fluctuations – the business cycles – are to be explained by the equilibrium-like reactions of agents to unanticipated changes in relevant variables, that must, in general, 'imply severe limitations on the ability of government policy to offset these initiating changes'.²⁶ This is to say that the need to formulate economic policy for stabilising the macroeconomic outcome over time is hardly ever present from a Lucasian perspective. The economic fluctuations we see over time should be considered as endogenous equilibrium-like adjustments made by the representative agent. As such, to achieve optimal outcomes, the task of fiscal policy is restricted to minimising intertemporal distortions. Likewise, as with monetary policy, it should be based on credible and transparent rules focusing on achieving a low and stable rate of inflation.

22. Lucas (2001, pp. 279 and 294). Therefore, to Lucas, technical matters are the only one way to gain scientific progress in economics: 'better mathematics, better mathematical formulations, better data, better data-processing methods, better statistical methods, better computational methods' (2004, p. 22).

23. Lucas, 1986, p. 122

24. Ibid.

25. Lucas, 2003, p. 2

26. Lucas and Sargent, 1979, p. 10

THE NEW KEYNESIANS: GET REAL!

However consistent and theoretically elegant the RBC school of thought may have appeared for young economists in the late 1970s and early 1980s, some – possibly infected with a Keynesian virus – found the New Classical theory too out of sync with real life. Come on – get real! Indeed, in real life, people experience not harmonious outcomes of optimality, but rather the very opposite or, for many, drastically troublesome economic conditions. It may be that, in the long run, the strength of the market mechanism is pushing the economy towards the unique intertemporal path of macroeconomic optimality and full employment, but, in the short term, we often experience less-than-perfect macroeconomic outcomes. This is evidenced by history. Indeed, the general economic story of the late 1970s and much of the '80s is one of economic recession.

Accordingly, an alternative to the story perpetuated by RBC economists became increasingly required. This alternative became known as the New Keynesianism.²⁷ Although in full methodological agreement with RBC,²⁸ they differed theoretically. Modern economies do not operate with perfection in the short run due to various imperfections and inflexibilities. The New Keynesians argue that, in the short-term, one must accept that aggregate demand has an important role to play. Indeed, Romer argued that 'only new Keynesian models provide an explanation of the importance of nominal disturbances to the real economy; and ... they also provide the most plausible explanation of why other aggregate demand shocks matter'.²⁹

As such, there may be a serious mismatch between aggregated demand and aggregated supply. That is, as the economy could be occasionally hit hard by economic downturns, involuntary unemployment is thus a real phenomenon for both individuals and society at large.

Furthermore, the New Keynesians argued that these disequilibrium situations of macroeconomic outputs of second best in the short run could be explained by various kinds of imperfections and inflexibilities in the goods and labour markets. The market situation might not always be one of perfect competition. Rather, some tendencies of monopolism are often experienced in most markets. Likewise, the price mechanism does not operate consistently perfectly in the short run. Indeed, it is costly to change prices continuously and, contractually, prices and wages may remain fixed for specific time periods (e.g., by collected labour market agreements). As such, the New Keynesians argue 'that nominal price rigidities are the essential way in which market economies differ from the Walrasian Arrow-Debreu model'.³⁰ Furthermore, they focus on incomplete contracts as central market failures, and thus try 'to explain the causes and consequences of these market failures'³¹ as key macroeconomic issues.

That said, however difficult or troublesome the short-term macroeconomic situation may be, market-based adjustment processes are set in motion so as to cope with short-run disequilibrium phenomena. However, it is worth noting that such adjustment take time.³²

27. For a wide reading of New Keynesianism, see Mankiw and Romer (1991), Greenwald and Stiglitz (1993), and Romer (1993).

28. That is, a methodological coherent understanding of arguing that firms and household are optimising economic units using rational expectations in their quest for an optimal intertemporal planning which must be analysed within a general equilibrium setting.

29. Romer, 1993, p. 21

30. Greenwald and Stiglitz, 1993, p. 25

31. Ibid.

32. Through Greenwald and Stiglitz (1993), the New Keynesians acknowledged the existence of rigidities in modern economies. Indeed, New Keynesians would generally argue that 'firms set prices and wages in an uncoordinated fashion, facing considerable uncertainties about the consequences of their actions. As a result, it will often be true that wages, prices, and interest rates are not at market clearing levels (and will not adjust rapidly to those levels), so that large parts of the economy will not be in equilibrium' (p. 42).

Therefore, given these imperfections and inflexibilities, economic policy changes might make a short-term difference by actively addressing the present economic problems. As such, there may be room for adjusting both fiscal and monetary policy. However, the policy strategy of the New Keynesians is much more refined than that of their older counterparts. The changes in economic policy should be specific rather than general. Policy should be targeted according to the nature of the present economic disequilibrium. A policy strategy of continuous 'stop and go' managing of the level of aggregate demand may thus not be the optimal approach to pursue. Furthermore, economic policy should not only focus on aggregate demand – despite this possibly working in the very short run – but also fixate on important supply-side matters, especially regarding longer-run considerations focusing on structurally mismatched problems in the economy. As such, the short-term tactics of economic policy must effectively accord with the overall given long-term economic strategy, thus ensuring that the economy finally achieves a macroeconomic outcome of optimality on the unique intertemporal equilibrium path of full employment.

MODERN TIMES – TIME TO MERGE: THE NNS

As discussed in the previous section, despite the RBC and New Keynesian's theoretical differences – the former advocating a more classical market fundamentalism – both agree on methodological matters. They both argue that there is only one acceptable way to conduct economics. Macroeconomics must have an explicit microeconomic foundation: firms and

households pursue the principle of optimisation and use rational expectations when planning for intertemporal optimality. Moreover, both proposed general equilibrium models as the only relevant setting for studying such behaviour.

Based on this agreement, a new synthesis gradually arose. Why not combine the core elements of the RBC programme and the New Keynesian understanding? Could one not succeed by accepting a skeleton of RBC arguments fleshed out by New Keynesian arguments on imperfection and inflexibilities?

This was exactly what happened when the NNS (New Neoclassical Synthesis) gained paradigmatic status and dominance in modern macroeconomics.³³ Empirically, the NNS understanding should be modelled within a dynamic stochastic general equilibrium (DSGE) framework.

The NNS benchmark model can be essentially characterised as a monopolistically competitive RBC model. As such, gaining macroeconomic optimality is a four-step process.³⁴ First, the representative household must plan its optimal intertemporal consumption pattern. Second, it must decide on how much to work. Three, given the optimal consumption pattern and the household's optimal supply of labour, combined with the process of profit maximisation of firms and the level of technology, the level of output and employment in the economy can be determined. Fourth, the Central Bank – through changes in the nominal interest rate – ensures that the real interest rate is set so as to be able to equilibrate the level of aggregate demand with the level of aggregate supply. In so doing, the economy can reach an optimal macroeconomic outcome.

33. An early contribution to the NNS understanding is given by Woodford, 2003

34. Goodfriend and King, 1997

The NNS understanding is thus a mixture of New Classical and New Keynesian features, as 'even though output may be demand-determined on a period-by-period basis... output must be supply-determined on average.³⁵ Therefore:

In the NNS model, fluctuations in aggregate demand can induce fluctuations in employment and output. In that sense the NNS model is Keynesian... Since firms maintain the profit maximizing markup on average over time in the NNS model, the NNS model behaves like the flexible price RBS model on average but with leeway for monetary policy to influence aggregate demand and stabilize employment and inflation.³⁶

Accordingly, the role of the Central Bank is crucial for gaining macroeconomic optimality, and a low and stable level of inflation (which both Friedman and Lucas had earlier argued was essential if economic prosperity would prevail to benefit both individuals and society):

... targeting inflation thus makes actual output conform to potential output, where potential output is defined as the fluctuating level of aggregate output that would be determined by supply factors in the flexible-price, imperfectly competitive real business cycle core of the economy. This line of argument implies that inflation targeting yields the best cyclical behavior of employment and output that monetary policy alone can deliver.³⁷

Based on the NNS, empirically, a DSGE model aims to introduce rigidities – the New Keynesian

imperfections and inflexibilities – into a dynamic framework where the economy can suffer from both short-term supply and demand shocks. As such, DSGE models consist of three parts.

The first is an aggregate demand block – a New Keynesian dynamic investment-savings (IS) curve – stating that the output gap in the short term is typically different from zero, meaning that the economy could be below or above the level of full employment. The IS curve relates the output gap to the real interest rate through consumption.³⁸

The second part is an aggregate supply block – a New Keynesian Phillips Curve³⁹ – which relates the rate of inflation to the output gap.⁴⁰ If an economy experiences a boom, the output gap closes and the rate of inflation increases. Conversely, if it experiences a recession, the output gap widens and the rate of inflation drops.

The last part consists of a monetary policy block typically modelled on a Taylor-rule-like design for optimal monetary policy. This block describes how the Central Bank, through changes in short-term nominal interest rates, reacts to fluctuations in both the output and inflation gaps. That is, the Central Bank tries to equalise the level of aggregate demand to the level of aggregate supply, thus gaining a macroeconomic output of optimality (in terms of output and inflation).

The triumph of the NNS led one of its founding fathers to state in 2009:

While the problems of the field have not all been resolved, there are no longer such fundamental disagreements among leading macroeconomists about what kind of questions one might reasonably seek to

35. Ibid., p. 256

36. According to Goodfriend (2004, p. 31), 'NNS locates the transmission of monetary policy to real activity in its influence on... the average markup. A monetary policy action which raises aggregate demand raises marginal cost and lowers average markup.'

37. Goodfriend, 2007, p. 61

38. Whereas an 'old' IS curve typically relates the output to the interest rate through investment.

39. Firms maximise profit in markets characterised by monopolistic competition. They typically act with some form of price inflexibility, modelled as a Calvo pricing rule.

40. Whereas an 'old' Phillips Curve relates the unemployment rate to the rate of inflation.

answer or what kinds theoretical analyses or empirical studies should be admitted as contributions to knowledge ... there are not really alternative approaches to the resolution of macroeconomic issues.⁴¹

A CRITIQUE OF THE NNS

To many economists, the global economic crisis from 2008 and onwards – often termed the ‘Great Recession’ – was somewhat of an eye-opener concerning the theoretical content and validity of the macroeconomic mainstream. As such, the NNS was subject to a storm of criticism from most heterodox macroeconomists – yet due to their many years of criticising the mainstream, this was hardly surprising. However, their denunciations were this time joined by some former mainstream macroeconomists, such as Romer⁴² and Stiglitz,⁴³ who raised critical voices against the dominant view of macroeconomics and called for changes.

For these critics, the NNS essentially told a story about harmonious macroeconomic outcomes of optimality that was too far removed from reality. There is a broad consensus that modern macroeconomies – being heavily dependent on globalised finance – is not so highly functioning as to always achieve a near-perfect performance. Indeed, the reverse seems true in that, most often, modern economies do not operate around an intertemporal equilibrium path of harmony. To claim that the quest for perfect intertemporal utility and profit maximisation automatically leads to macroeconomic outcomes of optimality may look nice in modern mainstream macroeconomic textbooks, but it certainly does not reflect the hard facts of reality. Firms and households do not act in

this way. Therefore, in general, the macroeconomic situation is not one of full employment. While economies experience booms, they also face years of recession wherein involuntary unemployment is seriously present.

That is, to many, the NNS, and its DSGE models, is highly out of sync with empirical evidence:

... it may not be surprising that these models often have a hard time describing macroeconomic data. The strong prevalence of non-stationarity in economic time series is, in itself, evidence of the fact that we do not know in which direction the future is moving ... we have to rely on such unrealistic assumptions that most results can be deemed empirically irrelevant from the outset.⁴⁴

However, it must be noted that many mainstreamers are not so foolish as to have been unaffected by the years of the Great Recession. Indeed, they have set changes in motion.

As such, the view on economic policy has changed. Conventional monetary policy cannot ensure equivalence between aggregate demand and aggregate supply alone. It must occasionally be helped by unconventional policy actions (quantitative easing).⁴⁵ Likewise, there may be more room for fiscal policy. It seems as if the multipliers are greater than expected, thereby making fiscal policy more effective in ‘zero-bound’ scenarios.⁴⁶ Moreover, we have learnt the hard way that financial aspects matter in macroeconomics. Therefore, DSGE models must account for this fact.⁴⁷ Furthermore, one could argue that now is the time to discard the representative agent and focus more on agent heterogeneity,⁴⁸ as perhaps the

41. Woodford, 2009, pp. 268 and 274

42. Romer, 2016

43. Stiglitz, 2018

44. Juselius, 2011, pp. 429 and 431

45. De Grauwe, 2020, chapters 8–10

46. Blanchard and Leigh, 2013

47. As indicated by Vines and Wills (2018, p. 2), ‘Many of us – although not all – were proud of what had been achieved. But the benchmark model has let us down: it explained neither why the GFC... [the global financial crisis]... happened, nor what to do about it.’

48. Galí, 2018

assumption of perfect rational expectations is too extreme.⁴⁹ Finally, there might be room for more models in macroeconomics than just those of the DSGE,⁵⁰ which themselves must be adjusted and improved in various ways.⁵¹

The mainstream has thus seemed to accept certain changes. However, seen from the perspective of its critics, these changes may be insufficient.

THE POST-KEYNESIANS

In their own perception, many post-Keynesians (especially those adhering to Davidson's definition⁵²) see themselves as the only true followers of Keynes. Although post-Keynesians are no more homogeneous than other groups of economists, their unique characteristic is that they place an enormous emphasis on three key concepts: time, uncertainty, and money.

In contrast to the mainstreamers, post-Keynesians view the economic system as one that is open, social, changeable, and path-dependent.⁵³ Simply put, they consider the economy to be evolutionary. Therefore, one must take the concept of time seriously. Economic behaviour unfolds in historical calendar time, not in model-made consistent time (meta time), as typically proposed by the mainstreamers. The correct ordering of past, present, and future is thus important. What happens today is partly determined by what happened yesterday, and tomorrow – the future – results from our actions today. Moreover,

when we deal with the future, we act in an environment tormented by uncertainty (both epistemologically and ontologically), thereby making it impossible to truly know the future – at least in some aspects. Therefore, firms and households urgently need to hedge their economics decisions, which they do by establishing contractual arrangements. As these contracts are set up in monetary terms, money thus truly matters.

Sheila Dow explained Keynes's understanding of uncertainty thusly:

For Keynes, the significance of uncertainty for economics follows from the nature of the economic system, which does not satisfy the conditions for certain knowledge. He saw social systems as being organic, involving complex interrelationships within an evolving structure of institutions and with individual behaviour being both social and in general non-deterministic. This was his 'vision' of economic reality, that is, his ontology.⁵⁴

Seen from a post-Keynesian perspective, while the NNS understanding tells a (seemingly coherent and logical) story of macroeconomics, it is still one out of sync with real-life phenomena. Economic evidence does not depict a world of harmony and optimality. Quite the contrary. The economic history of most countries is a story of economies out of equilibrium. It could be argued that the mainstreamers do not particularly address these problems when describing an economy placed

49. As Woodford (2013, p. 1) explained, '... [this assumption] ... is a strong one, and one may wonder if it should be relaxed ... the assumption that an economy's dynamics must necessarily correspond to an RE equilibrium may seem unjustifiably strong ... We should like, therefore, to replace the RE hypothesis by some weaker restriction, that nonetheless implies a substantial degree of conformity between people's beliefs and reality – that implies, at the least, that people do not make obvious mistakes'.

50. As such, Blanchard (2018, pp. 52–53) mentioned five types of useful macroeconomic models: i) "Foundational models" that deal with important theoretical aspects, ii) "DSGE models", iii) "Policy models" aiming to help the correct design of economic policy, iv) "Toy models", a rudimentary model that only addresses a few core issues and, v) "Forecasting models" focusing on giving the best forecasts possible'.

51. Christiano et al., 2018

52. Davidson is one of the most famous post-Keynesians still living. Throughout his life, he has advocated that one can learn tremendously from the writings of Keynes when analysing the many problems of modern financially globalised economies. On Davidson, see Olesen (2013). To Davidson, a true post-Keynesian builds their economic understanding on Keynes's *A Treatise on Probability* and *The General Theory of Employment, Interest and Money*, published in 1921 and 1936, respectively.

53. Chick and Dow, 2005

54. Dow, 2004, pp. 551–52

on the unique intertemporal path of sustained equilibrium. Instead, they overfocus on dealing with equilibrium rather than its opposite.⁵⁵ Furthermore, the modern macroeconomic mainstream pays scant regard to methodological aspects. To a post-Keynesian, methodological matters are crucial for correctly understanding economics. As such, there are many differences between the two schools of macroeconomics.⁵⁶

BEHAVIOURAL ECONOMICS

Similar to the post-Keynesians, behavioural economists seek to align economic theory with the facts of real life. Thaler⁵⁷ argued that neoclassical economics might be useful as benchmark models on optimisation but, when trying to build models 'to understand how people actually behave, we needed a new breed of descriptive theories designed specifically for that task'.⁵⁸

However, the modern generation of behavioural economists were not the first to state this obvious point. Indeed, such a view has been around for many years.⁵⁹ Suffice it to mention the pioneering work of Herbert Simon, who in the 1940s found that, generally speaking, firms do not run for first best solutions, but rather typically accept second best solutions. They neither have the necessary

cognitive abilities nor time to act optimally. As such, they are characterised by bounded rationality:

Two concepts are central to the characterization: *search* and *satisficing*. If the alternatives for choice are not given initially to the decision maker, then he must search for them. Hence, a theory of bounded rationality must incorporate a theory of search ... But utility maximization ... was not essential to the search scheme ... As an alternative, one could postulate that the decision maker had formed some *aspiration* as to how good an alternative he should find. As soon as he discovered an alternative for choice meeting his level of aspiration, he would terminate the search and choose that alternative. I have called this mode of selection *satisficing*.⁶⁰

Kahneman,⁶¹ Tversky, and McFadden⁶² showed that households, like firms, use 'rules-of-thumb' in their economic decision making. As McFadden concluded:

... what stands out is that humans fail to retrieve and process information consistently, and this generates a variety of cognitive anomalies ... I conclude that perception-rationality fails, and that the failures are systematic, persistent, pervasive, and large in magnitude.⁶³

55. As Kirman (2011, p. 62) argued, 'we should be more interested not in the periods where the economy is running along relatively smoothly, but in the periods where it changes... we should be studying non-normal periods, instead of normal ones, because that is what causes real problems. And we do not do that... That is the major failure in macroeconomics. It does not address the serious problems that we face when we get out of equilibrium. And we are out of equilibrium most of the time'.

56. Olesen (2010, Table 1, p. 121) highlighted some of the most important differences between these two macroeconomic world views.

57. Thaler, 2017

58. *Ibid.*, p. 491

59. As such, Keynes stated in 1938 that economics is 'a science of thinking in terms of models joined to the art of choosing models which are relevant to the contemporary world. It is compelled to be this, because, unlike the typical natural science, the material to which it is applied is, in too many respects, not homogeneous through time... Progress in economics consists almost entirely in a progressive improvement in the choice of models' (Moggridge, 1973, p. 296). Accordingly, Pecha and Milan (2009) have argued that Keynes could be seen as an early behavioural economist. That Keynes took psychological aspects, such as uncertainty, seriously in his economic thinking is beyond doubt (Koutsobinas, 2014). de Grauwe (2010) also tried to incorporate animal spirits as an important behavioural economic aspect in a new kind of DSGE model-setting which aligned more fully with empirical evidence than that of a traditional DSGE benchmark model.

60. Simon, 1979, pp. 502–503

61. Kahneman, 2003

62. McFadden, 1999

63. *Ibid.*, p. 96

To state rational choice as a behaviour has its limitations, as indicated by Nelson.⁶⁴ Humans do not act as robots, but (arguably) have free will and are motivated by more than only economic aspects regarding their economic behaviour. Indeed, humans' decision-making processes are also impacted by psychological, ethical and moral factors.⁶⁵ Therefore, economic theory must also focus on these aspects when seeking to explain goal-based economic behaviour.

Economic behaviour is undoubtedly neither perfect nor optimal. Both firms and households are bound to make mistakes in a complex and uncertain world:

... that people make predictable errors was profoundly important to the development of behavioral economics ... This was a crucial insight. It implies that, at least in principle, it would be possible to improve the explanatory power of economics by adding psychological realism.⁶⁶

In essence, the strategy of behavioural economics is useful for both micro- and macroeconomics, particularly when ensuring that economic theories are not so out of sync with real-life phenomena. Unsurprisingly, modern behavioural economics is successfully advancing through attracting an increasing number of proponents.⁶⁷ Thaler⁶⁸ thus seems apt in conclusion that:

Although not every application of behavioral economics will make the world a better place, I believe that giving economics a more

human dimension and creating theories that apply to Humans, not just Econs, will make our discipline stronger, more useful, and undoubtedly more accurate.⁶⁹

Finally, for Thaler, the success of behavioural economics' methodology should be seen as a return to the older economic thinking of Adam Smith, Irving Fisher and John Maynard Keynes (among others), rather than as a new revolutionary paradigm in economics.⁷⁰

CONCLUDING REMARKS

In light of the above, and from my own perspective, the journey towards the modern macroeconomic mainstream of NNS began with the writings of Friedman – especially his 1967 Presidential Address. It was based on this theoretical world view that Lucas refined Friedman's arguments and presented what became the New Classical theory, best known as the RBC. As such, Lucas initiated a both a theoretical and methodological revolution in macroeconomics.

However innovative and attractive RBC thinking may have appeared, some questioned its validity. New Keynesians argued that, in the short run, modern economies are generally not characterised by optimality and harmonious macroeconomic outcomes. They explained that this was due to various kinds of imperfection and inflexibility. As such, contrary to the RBC understanding, economic policy might have an important role in minimising economic fluctuations in the short term, as well

64. Nelson, 2004

65. 'If the world is mechanical, how can it also be moral and valuable? ... The notion that humans are created as rational decision-makers is, from a physical anthropology point of view, just as ludicrous as the notion that humans were created on the sixth day' (Nelson, 2004, pp. 213 and 215). On the need of incorporating ethical aspects in macroeconomics, see Olesen (2021).

66. Thaler (2017, p. 490). Furthermore, 'psychological theories of intuitive thinking cannot match the elegance and precision of formal normative models of belief and choice, but this is just another way of saying that rational models are psychologically unrealistic' (Kahneman, 2003, p. 1449).

67. 'The rise of behavioral economics is one of the most prominent conceptual developments in the social sciences in the past 40 years. Several factors have contributed to the growth of the field: the discovery of anomalies which challenge the traditional paradigm; the development of new, psychology-based models of economic behavior; advances in helping people to make better decisions; and an influx of talented researchers into the field' (Barberis, 2018, pp. 680–681).

68. Thaler, 2017

69. Ibid., pp. 512–13

70. Thaler, 2016, p. 1577

as focusing on how structural problems in the economy can be remedied in the long run.

As both the RBC proponents and the New Keynesians advocated the same kind of methodology, a ground-breaking revolution later took place. The NNS emerged to subsume the macroeconomic arena in a paradigmatic way. Dealing predominantly with short-term matters, the NNS, with its DSGE models, was New Keynesian-like whereas longer-term economies were expected to be more similar to the RBC. As such, there was room for certain policy actions, which was then filled by monetary policy. An optimal monetary policy was designed to follow Taylor-rule behaviour.

Unsurprisingly, however, the Great Recession served as an eye-opener for economists and laypeople alike. The choir of critics that hitherto had consisted primarily of non-mainstreamers began to grow. Now even some former mainstreamers have cried out for changes. Macroeconomics had to become less 'post-real' (to paraphrase Paul Romer). While the NNS has tried to incorporate important new aspects – e.g., financial matters and agent heterogeneity – it is still built on the previously existing theoretical core with the same DSGE-style modelling. Consequently, some still question the relevance of the NNS and argue that macroeconomic alternatives are required.

However, it should be noted that alternatives already exist. Here, I have emphasised the post-Keynesians and behavioural economists due to their sharing many common features – despite the fact that they themselves may not be fully aware of this. In essence, both schools of thought seek to achieve a better accordance with real

life than the proponents of NNS. The empirical evidence is unambiguously clear. In the real world, neither firms nor households behave as rational economic men. They do not run for optimality. In an economic environment characterised by uncertainty, they are satisfied with realising the best of the second-best possibly solutions (a fact widely established for many years). Perfect intertemporal planning leading to macroeconomic outcomes of optimality on the unique equilibrium path is a textbook story, not one that accurately reflects real-life economic activity.

Allow me to end this article with a bold suggestion. There may well be new important theoretical and empirical knowledge to be gained by more actively combining the approach of the post-Keynesians with the core elements of behavioural economics. Indeed, in so doing, one might be able to challenge the dominance of modern mainstream macroeconomic understanding more thoroughly than ever before. As such, this suggested new approach may prove with time to become a genuinely progressive Lakatosian research programme capable of delivering what Lakatos himself termed 'novel facts'.⁷¹ That is, a new research programme that is capable of producing new theoretical as well as recent empirical facts hitherto unknown – e.g., giving a better understanding of how economic behaviour in an economic environment of fundamental uncertainty is not perfect, e.g., Olesen (2019 and 2010), thereby incorporating various kinds of behavioural bias into macroeconomic theory (bounded rationality, herd behaviour, loss aversion, animal spirits etc.). If successful, macroeconomics would gain a higher level of scientific status and become better aligned with facts of real life.

71. Lakatos, 1978. On applying a Lakatosian methodology on the history of economics, see e.g., Blaug, 1997

REFERENCES

- Barberis, N.** (2018), Richard Thaler and the Rise of Behavioral Economics, *The Scandinavian Journal of Economics*, 120(3), 661–684
- Barro, R. and Grossman, H.** (1971), A General Disequilibrium Model of Income and Employment, *The American Economic Review*, 61(1), 82–93
- Blanchard, O.** (2018), On the future of macroeconomic models, *Oxford Review of Economic Policy*, 34(1–2), 43–54
- Blanchard, O. and Leigh, D.** (2013), *Growth Forecast Errors and Fiscal Multipliers*, IMF Working Paper – WP/13/1, International Monetary Fund 2013
- Blaug, M.** (1997), *The methodology of economics or how economists explain*, 2ed., Cambridge University Press
- Chick, V. and Dow, S.** (2005), The meaning of open systems, *The Journal of Economic Methodology*, 12(3), 363–381
- Christiano, L. et al.** (2018), On DSGE Models, *The Journal of Economic Perspectives*, 32(3), 113–140
- Clower, R.** (1965), The Keynesian Counter-Revolution: A Theoretical Appraisal. In F. H. Hahn, and F. P. R. Brechling (Eds.), *The Theory of Interest Rates* (pp. 103–125). Macmillan
- Davidson, P.** (2016), Rejoinder to Rosser, O'Donnell, and Carrión Álvarez and Ehnts on their criticisms of my ergodic/nonergodic formulation of Keynes's concept of an actuarial certain future vs. an uncertain future, *Journal of Post Keynesian Economics*, 39(3), 308–333
- De Grauwe, P.** (2010), The scientific foundation of dynamic stochastic general equilibrium (DSGE) models, *Public Choice*, 44(3–4), 413–443
- De Grauwe, P.** (2020), *Economics of Monetary Union* (13th ed.). Oxford University Press
- Dow, S.** (2004), *Uncertainty and Monetary Policy*, *Oxford Economic Papers*, 56(3), 539–561
- Friedman, M.** (1968), The Role of Monetary Policy, *The American Economic Journal*, 58(1), 1–17
- Galí, J.** (2018), The State of New Keynesian Economics: A Partial Assessment, *The Journal of Economic Perspectives*, 32(3), 87–112
- Greenwald, B. and Stiglitz, J.** (1993), New and Old Keynesians, *The Journal of Economic Perspectives*, 7(1), 23–44
- Goodfriend, M.** (2004), Monetary Policy in the New Neoclassical Synthesis: A Primer, *Federal Reserve Bank of Richmond Economic Quarterly*, 90(3), 21–45
- Goodfriend, M.** (2007), How the World Achieved Consensus on Monetary Policy, *The Journal of Economic Perspectives*, 21(4), 47–68
- Goodfriend, M. and King, R.** (1997), The New Neoclassical Synthesis and the Role of Monetary Policy, *NBER Macroeconomics Annual*, 12, 231–296
- Hicks, J.** (1937), Mr. Keynes and the 'Classics': A Suggested Interpretation, *Econometrica*, 5(2), 147–159
- Juselius, K.** (2011), Time to reject the privileging of economic theory over empirical evidence? A reply to Lawson, *Cambridge Journal of Economics*, 35(2), 423–436
- Kahneman, D.** (2003), Maps of Bounded Rationality: Psychology for Behavioral Economics, *The American Economic Review*, 93(5), 1449–1475
- Keynes, J.M.** (1973), *The General Theory of Employment, Interest and Money*, Macmillan, Cambridge University Press, (Original work published 1936)

- Kirman, A.** (2011), The economic entomologist – An interview with Alan Kirman, *Erasmus Journal for Philosophy and Economics*, 4(2), 42–66
- Koutsobinas, T.** (2014), Keynes as the first behavioral economist: the case of the attribute-substitution heuristic, *Journal of Post Keynesian Economics*, 37(2), 337–355
- Laidler, D.** (2005), 2005-11 Milton Friedman and the Evolution of Macroeconomics, Economic Policy Research Institute, EPRI Working Papers, 2005-11, London, ON: Department of Economics, University of Western Ontario
- Laidler, D.** (2018), Was the fuss? Friedman (1968) after 50 years, *Review of Keynesian Economics*, 6(4), 437–445
- Lakatos, I.** (1978), *The Methodology of Scientific Research Programmes. Philosophical Papers, Vol. 1*, Cambridge University Press
- Lucas, R.E.** (1976), Econometric Policy Evaluation: A Critique. In K. Brunner, and A. H. Meltzer (Eds.). *The Phillips Curve and Labor Markets (Carnegie-Rochester Conference Series on Public Policy)* (Vol. 1, pp. 19–46). North-Holland Publishing Company
- Lucas, R.E.** (1986), Principles of Fiscal and Monetary Policy, *Journal of Monetary Economics*, 17(1), 117–134
- Lucas, R.E.** (2001), Professional Memoir. In Breit, W. and Hirsh, B.T. (Eds.). *Lives of the Laureates* (4th ed., pp. 273–297)
- Lucas, R.E.** (2003), Macroeconomic Priorities, *The American Economic Review*, 93(1), 1–14
- Lucas, R.E.** (2004), Keynote Address to the 2003 HOPE Conference: My Keynesian Education *History of Political Economy*, Annual Supplements 2004, 12–24
- Lucas, R.E. and Sargent, T.J.** (1979), After Keynesian Macroeconomics, *Federal Reserve Bank of Minneapolis Quarterly Review*, Spring 1979, 1–16
- Malinvaud, E.** (1977), *The Theory of Unemployment Reconsidered*. Basil Blackwell
- Malinvaud, E.** (1980), *Profitability and Unemployment*. Cambridge University Press
- Mankiw, N.G. and Romer, D.** (Eds.). (1991), *New Keynesian Economics*. MIT Press
- McFadden, D.** (1999), Rationality for Economists?, *Journal of Risk and Uncertainty*, 19(1), 73–105
- Modigliani, F.** (1944), Liquidity Preference and the Theory of Interest and Money, *Econometrica*, 12(1), 45–88
- Moggridge, D. (Ed.)**. (1973), *The Collected Writings of John Maynard Keynes, Vol. XIV, The General Theory and After, Part II: Defence and Development*. Macmillan
- Muelbauer, J. and Portes, R.** (1978), Macroeconomic Models with Quantity Rationing, *The Economic Journal*, 88(352), 788–821
- Nelson, J.A.** (2004), Is Economics a Natural Science?, *Social Research*, 71(2), 211–222
- Olesen, F.** (2010), Uncertainty, Bounded Rationality and Post Keynesian Macroeconomics, *INTERVENTION: European Journal of Economics and Economic Policies*, 7(1), 109–124
- Olesen, F.** (2013), Teaching macroeconomics: Seeking inspiration from Paul Davidson. In J. Jespersen, and M. O. Madsen (Eds.). *Teaching Post Keynesian Economics* (pp. 134–149). Edward Elgar Publishing
- Olesen, F.** (2019), Ergodicity/non-ergodicity or else? In J. Jespersen and F. Olesen (Eds.). *Progressive Post-Keynesian Economics – Dealing with Reality* (pp. 42–54). Edward Elgar Publishing
- Olesen, F.** (2021), Macroeconomics must have an ethical foundation, *International Journal of Pluralism and Economics Education*, 12(2), 138–151

- Palley, T.** (2014), *Milton Friedman's economics and political economy: an old Keynesian critique*, Working Paper 134, IMK Macroeconomic Policy Institute, Hans Böckler Stiftung
- Pecha, W. and Milan, M.** (2009), Behavioral economics and the economics of Keynes, *The Journal of Socio-Economics*, 38(6), 891–902
- Phelps, E.** (1967), Phillips Curves, Expectations of Inflation and Optimal Unemployment over Time, *Economica*, 34(135), 254–281
- Phelps, E.** (1968), Money-Wage Dynamics and Labor-Market Equilibrium, *Journal of Political Economy*, 76(4–Part 2), 678–711
- Romer, D.** (1993), The New Keynesian Synthesis, *The Journal of Economic Perspectives*, 7(1), 5–22
- Romer, P.** (2016), *The Trouble with Macroeconomics*, 14 September 2016, accessed 29 April 2022, <https://paulromer.net/the-trouble-with-macro/WP-Trouble.pdf>
- Rudebusch, G.D.** (2005), Assessing the Lucas Critique in Monetary Policy Models, *Journal of Money, Credit and Banking*, 37(2), 245–272
- Samuelson, P. and Solow, R.** (1960), Analytical Aspects of Anti-Inflation Policy, *The American Economic Review*, 50(2), 177–194
- Simon, H.A.** (1979), Rational Decision Making in Business Organizations, *The American Economic Review*, 69(4), 493–513
- Stiglitz, J.** (2018), Where modern macroeconomics went wrong, *Oxford Review of Economic Policy*, 34(1–2), 70–106
- Storm, S.** (2018), The wrong track also leads someplace: Milton Friedman's presidential address at 50, *Review of Keynesian Economics*, 6(4), 517–532
- Thaler, R.** (2016), Behavioral Economics: Past, Present, and Future, *The American Economic Review*, 106(7), 1577–1600
- Thaler, R.** (2017), *From Cashews to Nudges: The Evolution of Behavioral Economics*, [Nobel Lecture], NobelPrize.org, accessed 29 April 2022, <https://www.nobelprize.org/uploads/2018/01/thaler-lecture.pdf>
- Vines, D. and Wills, S.** (2018), The rebuilding macroeconomic theory project: An analytical assessment, *Oxford Review of Economic Policy*, 34(1–2), 1–42
- Woodford, M.** (2003), *Interest and Prices: Foundations of a Theory of Monetary Policy*, Princeton University Press
- Woodford, M.** (2009), Convergence in Macroeconomics: Elements of the New Synthesis, *American Economic Journal: Macroeconomics*, 1(1), 267–279
- Woodford, M.** (2013), Macroeconomic Analysis without the Rational Expectations Hypothesis, accessed 29 April 2022, <http://blogs.cuit.columbia.edu/mw2230/files/2017/08/AREcon.pdf>

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