

1 The development of modern macroeconomics

A rough guide

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Any economics student who graduated from university in the late 1960s and early 1970s, as we both did, would have found macroeconomics a much easier and far less controversial subject to study then than it is today. Since the breakdown of the Keynesian consensus in the early 1970s, macroeconomics has been in a 'state of disarray' (Brunner 1989) having witnessed the appearance of a number of conflicting and competing approaches. As a result modern macroeconomics is a rapidly changing diverse subject with a built-in tendency to generate deep divisions. These divisions have led to the formation of schools of thought consisting of economists who share a broad vision of how macroeconomic phenomena are generated. In order to better understand current controversies it is necessary, in our view, to know how macroeconomic thought has developed since Keynes's *General Theory* (1936) was published. In this opening chapter we briefly survey *some* of the important developments in the evolution of macroeconomics since the mid-1930s. Our purpose is not to critically assess in detail the central tenets underlying and policy implications of the main macroeconomic schools of thought, rather it is to provide a background discussion in order to help place the readings that follow in context (for a more detailed survey of competing schools of thought see Phelps 1990; Chrystal and Price 1994; Snowdon *et al.* 1994).

Although there are significant differences between the various schools of thought, the work of Keynes remains a central point of reference because, as Vercelli (1991) argues, all the schools define themselves in relation to the ideas originally put forward by Keynes in his *General Theory*, either as a development of some version of his thought or as a restoration of some version of pre-Keynesian classical thought. A unifying theme in the evolution of modern macroeconomics has been an 'ever-evolving classical Keynesian debate' (see Gerrard 1996). Although elsewhere (Snowdon *et al.*, 1994) we have identified seven schools of thought which have been influential in the development of macroeconomic analysis since the mid-1930s, each of these schools can be viewed as adhering to one of two basic positions in terms of broad vision. Gregory Mankiw (1989) – reprinted in Part IV – describes these two positions by distinguishing between the

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classical school and the Keynesian school with respect to their faith in the 'invisible hand'.

The classical school emphasizes the optimization of private economic actors, the adjustment of relative prices to equate supply and demand, and the efficiency of unfettered markets. The Keynesian school believes that understanding economic fluctuations requires not just studying the intricacies of general equilibrium, but also appreciating the possibility of market failure on a grand scale.

Hence, although it is possible to distinguish between orthodox Keynesians, new Keynesians and post-Keynesians, all three groups are united in the belief that aggregate economic instability represents 'some sort of market failure on a grand scale' (Mankiw 1990). In contrast the majority of economists who have been prominent in the monetarist, new classical, real business cycle and Austrian schools have tended to place their faith in market forces as an equilibrating mechanism and question the capacity and desirability of government intervention as a means of achieving the major macroeconomic objectives. Following Gerrard (1996) the seven schools of thought identified above can also be differentiated and classified as orthodox, new or radical. The two 'orthodox' schools, 'IS-LM Keynesianism' and 'neoclassical monetarism', dominated macroeconomic *theory* in the period up to the mid-1970s. Since then three 'new' schools have been highly influential. The new classical, real business cycle and new Keynesian schools place emphasis on issues relating to aggregate supply in contrast to the orthodox schools which focused their research primarily on the factors determining aggregate demand and the consequences of demand-management policies. In particular the new schools share the view that macroeconomic models should be based on solid microeconomic foundations. The 'radical' post-Keynesian and Austrian schools are both critical of mainstream analysis whether it be orthodox or new. Since modern macroeconomics has been most influenced by the orthodox and new schools we will confine our discussion here to their contributions (see Davidson 1994 and Chick 1995 for a discussion of post-Keynesian macroeconomics; Garrison 1994 presents the case for the Austrian approach).

In the final section of this opening chapter we briefly review the renaissance of economic growth analysis which since the mid-1980s has moved into the centre stage of macroeconomic research after twenty years of relative neglect. The consequences of economic growth for economic welfare are so important that many prominent macroeconomists who previously concentrated their research efforts on the analysis of business cycles have now turned their attention to theoretical and empirical issues arising out of the burgeoning endogenous growth literature (see Barro and Sala-i-Martin 1995; Mankiw 1995).

KEYNESIAN ECONOMICS AND THE KEYNESIAN REVOLUTION

The birth of modern macroeconomics can be traced back to the 1930s, and in particular the publication of John Maynard Keynes's (1936) *General Theory of Employment, Interest and Money*. Prior to the 1930s the dominant view, in what we now call macroeconomics, was the classical approach that within capitalist market economies which are subject to periodic shocks the market mechanism would operate quickly and efficiently to restore full employment equilibrium. In such circumstances government intervention to stabilize the economy was believed to be neither necessary nor desirable. However, the experience of the 1920s and 1930s in Britain, and that of all major capitalist market economies during the 1930s, appeared to shatter the classical assumption that full employment was the normal state of affairs. In Britain the rate of unemployment never fell below 10 per cent between 1921 and 1938, and actually exceeded 20 per cent in 1931 and 1932. In the United States unemployment reached a peak of 25 per cent in 1933 and was still almost 10 per cent in 1941. Writing against this background Keynes (1936) put forward a new and revolutionary theory to explain, and provide a remedy for, the then-prevailing persistent and severe unemployment. In doing so Keynes was responding to what undoubtedly was the most significant macroeconomic event of the twentieth century; the Great Depression gave birth to modern macroeconomics.

The causes of the Great Depression are still the subject of considerable dispute and finding a plausible explanation for the global economic collapse during the early 1930s remains the 'Holy Grail' of macroeconomics (see C. D. Romer 1993; Bernanke 1995). In an extensive study of the US experience Gordon and Wilcox (1981) concluded that the cause of the Great Depression can be traced to a series of domestic spending shocks, both monetary and non-monetary. The initial decline in output during the 1929–31 period can be traced to a decline in consumption and residential investment expenditures. After September 1931 the recession was turned into the Great Depression by the perverse actions of the Federal Reserve in letting the money supply decline drastically (see Friedman and Schwartz 1963). Hence the Great Depression resulted from a shift of the aggregate demand curve to the left and the impact of the monetary contraction was transmitted worldwide via the operation of the gold standard (see Eichengreen 1992). The self-equilibrating tendencies of the market failed to come into play and as a result we have the best known example of massive monetary non-neutrality. In the face of enormous unemployment, nominal wages failed to adjust sufficiently to shift the aggregate supply curve so as to restore full employment (Bernanke and Carey 1996). The worldwide decline in aggregate demand as an explanation for the Great Depression has its origin in the work of Keynes, for it was his analysis in the *General Theory* which turned economists' attention away from the classical emphasis on supply-side factors. Although economists certainly examined (what we now

call) macroeconomic issues prior to the publication of the *General Theory*, even Pigou argued that Keynes was the first economist to bring together real and monetary factors 'in a single formal scheme, through which their interplay could be coherently investigated' (quoted in Solow 1986). The dominance of Keynes in the field of macroeconomics prior to his death in 1946 is clearly illustrated by looking at data on citations for the period

Table 1.1 Most cited macroeconomists 1920–30

<i>Rank</i>	<i>Name</i>	<i>Number of citations</i>
1	Irving Fisher	30
2	W. C. Mitchell	24
3	A. C. Pigou	21
4	Alfred Marshall	15
5	W. S. Jevons	13
6	R. G. Hawtrey	11
	D. H. Robertson	11
8	H. L. Moore	10
	Carl Snyder	10
10	J. M. Keynes	9

Table 1.2 Most cited macroeconomists 1931–5

<i>Rank</i>	<i>Name</i>	<i>Number of citations</i>
1	J. M. Keynes	66
2	D. H. Robertson	44
3	F. von Hayek	33
4	R. G. Hawtrey	30
	I. Fisher	30
6	G. Cassel	22
7	A. C. Pigou	20
8	K. Wicksell	17
9	A. Hansen	14
10	A. Marshall	13

Table 1.3 Most cited macroeconomists 1936–9

<i>Rank</i>	<i>Name</i>	<i>Number of citations</i>
1	J. M. Keynes	125
2	D. H. Robertson	48
3	J. Hicks	33
4	A. C. Pigou	31
5	Roy Harrod	27
6	R. G. Hawtrey	25
7	F. von Hayek	24
	G. Haberler	24
9	Joan Robinson	20
10	J. M. Clark	18

Table 1.4 Most cited macroeconomists 1940–4

Rank	Name	Number of citations
1	J. M. Keynes	59
2	J. Hicks	30
3	G. Haberler	24
4	D. H. Robertson	22
5	R. G. Hawtrey	20
6	M. Kalecki	18
	J. Schumpeter	18
8	A. Hansen	17
	N. Kaldor	17
10	S. Kuznets	16
	A. Lerner	16

Source: Deutscher (1990)

1920–44 (see Tables 1.1–1.4). The outstanding feature of these tables is the extent to which Keynes had come to dominate macroeconomics by the mid-1930s.

In Solow's (1986) view, the *General Theory* 'has certainly been the most influential work of economics of the 20th century, and Keynes the most important economist'.

A central theme of Keynes's analysis is the contention that capitalist market economies are inherently unstable and are capable of coming to rest 'in a chronic condition of sub-normal activity for a considerable period without any marked tendency, either towards recovery or towards complete collapse' (Keynes 1936: 249). This instability was in Keynes's view predominantly the result of fluctuations in aggregate demand and the Great Depression resulted from a sharp fall in investment expenditure 'occasioned by a cyclical change in the marginal efficiency of capital'. The resulting unemployment was *involuntary* and reflected a state of deficient aggregate demand. Given the weak equilibrating powers of the market mechanism in these circumstances the implication of Keynes's analysis was that fiscal and monetary policy could correct the aggregate instability exhibited by market economies and help stabilize the economy at full employment. Once full employment is restored Keynes accepted that 'the classical theory comes into its own again' and Keynes was optimistic that limited government intervention could remedy the shortcomings of the invisible hand (see Keynes 1936: 379). Managed capitalism, with a commitment to full employment, was the kind of system Keynes had in mind when in the concluding section of his famous essay *The End of Laissez-Faire* (1924) he argued that:

For my part I think that capitalism, wisely managed, can probably be made more efficient for attaining economic ends than any alternative yet in sight, but that in itself it is in many ways objectionable. Our problem is

to work out a social organisation which shall be as efficient as possible without offending our notions of a satisfactory way of life.

(reprinted in Keynes 1972: 294)

Keynes objected to mass unemployment which his analysis defined as largely *involuntary*. In such a situation the economy can be said to be operating in what Tobin (1992) refers to as 'the Keynesian regime'. Here aggregate economic activity is *demand constrained* and additional 'effective' demand creates its own supply since the economy has the necessary spare capacity during a recession. However, once full employment is restored, the economy operates in the *supply constrained* classical regime. Here supply creates its own demand. Whereas the classical model recognizes only the supply constrained regime, Keynes and Keynesians believe that the economy is capable, at different times, of being in either regime.

As early as the mid-1950s the consensus which was beginning to emerge in macroeconomics particularly in the USA was labelled the neoclassical synthesis by Samuelson:

In recent years 90 per cent of American economists have stopped being 'Keynesian economists' or 'anti-Keynesian economists'. Instead they have worked towards a *synthesis* of whatever is valuable in older economics and in modern theories of income determination. The result might be called *neoclassical* economics and is accepted in its broad outlines by all but about 5 per cent of extreme left-wing and right-wing writers.

(Samuelson 1955: 212, emphasis added)

The initial synthesis proceeded along two lines of inquiry. The first studied the long-run movement of output by identifying the determinants of the trend and ignoring fluctuations around the trend. Significant contributions were made during this period to the development of growth theory (see Hahn and Matthews 1964). The second line of inquiry concentrated on the analysis of short-run fluctuations around the trend. At the centre of this analysis lay the Hicks-Hansen IS-LM framework (Hicks 1937; Hansen 1953; Young 1987; Darity and Young 1995). During this period a great deal of macroeconomic research was devoted to refining the four basic building blocks of the IS-LM model, namely the consumption function, the investment function and the demand for, and supply of, money.

During the late 1950s and early 1960s a consensus emerged with respect to the 'Keynes v. Classics' debate in which it was generally accepted that at the theoretical level, once the Pigou or wealth effect of falling prices on consumption expenditure is taken into account, then unemployment equilibrium is possible in the Keynesian IS-LM model only where downward money wage rigidity prevents the classical automatic adjustment to full employment. Nevertheless at the practical policy level it was conceded that the process of adjustment via the Pigou effect might be so weak and

slow that interventionist policies (notably expansionary fiscal policy) would be required in order to achieve the primary stated objective of full employment (see Snowdon *et al.* 1994: Chapter 3). With a relatively inelastic IS curve and a relatively elastic LM curve Keynesianism became synonymous with 'fiscalism' and policies to fine tune the macroeconomy.

The publication of the results of Bill Phillips's (1958) statistical investigation into the relationship between the level of unemployment and wage inflation, and Richard Lipsey's (1960) subsequent theoretical rationale for the curve, proved to be another important development during this period (see Santomero and Seater 1978; Wulwick 1987). The Phillips curve was quickly adopted by orthodox Keynesian economists for three main reasons. First, it provided an explanation of price determination, and inflation, which was missing in the then-prevailing macroeconomic model. Within the IS-LM model the price level is assumed to be fixed at less than full employment with the result that changes in aggregate demand affect only the level of output and employment. Up to full employment money wages are assumed to be fixed and unresponsive to changes in aggregate demand. The Phillips curve allowed the orthodox theory of output and employment determination to be linked to a theory of wage and price inflation (see Lipsey 1978). Second, the Phillips curve appeared to provide rare evidence of a stable relationship between unemployment and inflation that had existed for almost a century. Third, the curve provided an insight into the problem that policy-makers face of simultaneously achieving high levels of employment with price stability given the trade-off between wage inflation and unemployment. As such the Phillips curve was interpreted by many orthodox Keynesians as implying a stable long-run trade-off which offered the authorities a menu of possible inflation-unemployment combinations for policy choice (see for example Samuelson and Solow 1960). Up to at least the mid-to-late 1960s the prevailing Keynesian consensus in macroeconomics was one in which the IS-LM model was used to explain the determination of output and employment, while the Phillips curve enabled policy-makers to predict the rate of inflation which would result from different target levels of unemployment being attained by activist demand-management policies. This consensus position was first seriously challenged by Milton Friedman, who launched the monetarist attack against orthodox Keynesian analysis and policy-activism during the 1950s and 1960s.

THE MONETARIST COUNTER-REVOLUTION

Friedman's starting-point was one in which he sought to re-establish the quantity theory of money approach to macroeconomic analysis which had been usurped by the Keynesian revolution. In the mid-to-late 1940s and the 1950s the then-prevailing Keynesian orthodoxy emphasized real demand disturbances (notably fluctuations in investment and autonomous

consumption) as the main cause of fluctuations in money or nominal income, predominantly in the form of changes in real income. In contrast, within the quantity theory approach, changes in the money stock are regarded as the predominant, though not the only, factor explaining changes in money income. Nevertheless Friedman (1956) initially presented his now famous restatement of the quantity theory of money as a theory of the demand for money rather than a theory of the general price level or money income. In his paper he asserted that the demand for money function was stable, an assertion which lies at the heart of the modern quantity theory approach to macroeconomic analysis. If the demand for money function is stable then velocity will also be stable, changing in a predictable manner if any of the limited number of variables in the demand for money function should change (see Laidler 1993). Over the period of the mid-to-late 1950s to the mid-1960s various empirical evidence was put forward in support of the belief that most of the observed instability in the economy could be attributed to factors which affected the supply of money independently of any change in the demand for money. In the latter case it was claimed that changes in the demand for money tend to take place gradually or result from events set in motion by prior changes in the supply of money.

The most persuasive evidence to support the belief that changes in the stock of money play a largely independent role in cyclical fluctuations was presented by Milton Friedman and Anna Schwartz (1963) in their influential study of the *Monetary History of the United States* (see Lucas 1994; Miron 1994). Friedman and Schwartz found that the only times when there was an *absolute* fall in the money stock corresponded with the six periods of major economic contraction over the period 1867–1960. Furthermore from studying the historical circumstances underlying the changes that occurred in the money stock during the six major recessions, they argued that the factors producing monetary contraction were mainly independent of contemporary or prior changes in money income and prices. In such circumstances Friedman and Schwartz interpreted monetary changes as the *cause*, rather than the consequence, of major recessions. For example, re-examining the monetary history of the period of the Great Depression, they argued that the depression became ‘Great’ only as a consequence of the failure of the Federal Reserve to prevent a dramatic decline in the money stock; between October 1929 and June 1933 the money stock fell by about a third. According to Friedman and his associates, the Great Depression demonstrated the potency, rather than the ineffectiveness, of monetary change and monetary policy (see Hammond 1996). However, because of the length and variability of the time lag involved between the implementation of monetary policy and its effects on money income (see Friedman 1958; 1961) it was suggested that discretionary monetary policy could turn out to be destabilizing. In consequence Friedman argued that the money supply should be allowed to grow at a fixed rate in line with the underlying growth of output to ensure long-term price stability.

The direction of the monetarist attack against the Keynesian demand-management policies and policy-activism changed at the end of the 1960s when Friedman (1968) augmented the basic Phillips curve with the expected rate of inflation as an additional variable determining the rate of change of money wages (Phelps 1967 provided a similar analysis from a non-monetarist perspective). While *A Monetary History* has undoubtedly been Friedman's most influential book in the macroeconomics sphere, his 1967 presidential address to the American Economic Association published as 'The Role of Monetary Policy' (1968) has certainly been his most influential article. In 1981 Robert Gordon described this paper as probably the most influential article written in macroeconomics in the previous twenty years. More recently James Tobin (1995), one of Friedman's most eloquent, effective and long-standing critics, has gone even further, describing the 1968 paper as 'very likely the most influential article ever published in an economics journal' (emphasis added). Friedman's utilization of Wicksell's concept of the 'natural rate' in the context of unemployment was in rhetorical terms a 'masterpiece of marketing' (see Dixon 1995) just as the application of the term 'rational' to the expectations hypothesis turned out to be in the rise of new classical economics during the 1970s. The impact of Professor Friedman's work forced Keynesians to restate and remake their case for policy-activism even before that case was further undermined by the penetrating theoretical critiques of Robert Lucas and other leading new classical economists. In line with orthodox neoclassical microeconomic analysis, Friedman suggested that the demand for and supply of labour should be specified in real not money terms. Friedman denied the existence of a permanent (long-run) trade-off between inflation and unemployment, and put forward the 'natural rate of unemployment' hypothesis. Five main implications for the role and conduct of stabilization policy derive from the view that the long-run Phillips curve is vertical at the natural rate of unemployment. First, the authorities can reduce unemployment below the natural rate only in the short run and then only because inflation is not fully anticipated. The assumption underlying orthodox monetarist analysis is that expected inflation adjusts to actual inflation only gradually in line with the so-called 'adaptive' expectations hypothesis. Second, any attempt to maintain unemployment permanently below the natural rate will result in accelerating inflation. Third, if governments wish to reduce the natural rate of unemployment in order to achieve higher output and employment levels they should pursue supply-management policies which are designed to improve the structure and functioning of the labour market and industry rather than demand-management policies. Fourth, the natural rate is compatible with any rate of inflation which in turn is determined by the rate of monetary expansion in line with the quantity theory tradition. Given the belief that inflation is essentially a monetary phenomenon (see Friedman 1970) propagated by excessive monetary growth monetarists argue that inflation can be reduced only by slowing down the rate of growth of the

money supply. In monetarist analysis the output/employment cost of disinflation depends on three main factors namely: (1) whether the authorities follow a path of rapid or gradual monetary contraction (cold turkey v. gradualism); (2) the extent of institutional adaptations such as indexation (see Friedman 1974); and (3) the speed economic agents adjust their inflation expectations downwards which in large part depends on the credibility of any anti-inflation strategy. Finally, in a world of fixed exchange rates inflation is viewed as an international monetary phenomenon explained by an excess-demand expectations model. Monetarists attribute the acceleration of inflation that occurred in western economies in the late 1960s primarily to an increase in the rate of monetary expansion in the United States in order to finance increased spending on the Vietnam War (see for example Johnson 1972; Laidler 1976). In practice the US determined monetary conditions for the rest of the world, a situation which eventually proved unacceptable to other countries and helped lead to the breakdown of the Bretton Woods system in the early 1970s.

During the early 1970s the subject of the possible existence of a long-run vertical Phillips curve became a controversial issue in the Keynesian-monetarist debate and numerous empirical studies of the expectations – augmented Phillips curve were undertaken. However by the mid-to-late 1970s at least as far as the United States was concerned, the majority of mainstream Keynesians had come to accept that the Phillips curve was vertical in the long run (see Blinder 1988 – reprinted on pp. 109–34). While the controversy over the slope of the long-run Phillips curve was largely laid to rest, the associated controversy over the role for short-run interventionist stabilization policy continued unabated. Even if the long-run Phillips curve is vertical, Keynesian arguments justifying intervention to stabilize the economy in the short run can be made on the grounds of the length of time required for the economy to return to the natural rate of unemployment and the potential to identify and respond to economic disturbances.

The failure of inflation to slow down both in the US and UK economies in 1970–1, despite rising unemployment, and the subsequent simultaneous rise of unemployment and inflation during the 1970s destroyed the idea that there might be a *permanent* long-run trade-off between inflation and unemployment. These events also verified the predictions of Friedman's model and contradicted the then-prevailing Keynesian views. As a result of these developments there is little doubt that Milton Friedman became 'the most influential macroeconomist' from the late 1960s to the mid-1970s (see Snowden and Vane 1997). With hindsight 1976, the year when he was awarded the Nobel Prize for Economics, probably marked the pinnacle of Friedman's influence in academia even if monetarism had yet to rise (and fall) in the policy-making arena following the initiation of the Volcker and Thatcher disinflations (see Friedman 1977; Blinder 1987).

Although within academia monetarism is no longer the influential force it was in the late 1960s and early 1970s, a large part of the reason for this

apparent decline can be attributed to the fact that mainstream macroeconomics has absorbed the insights of monetarism with a small 'm'. The expectations-augmented Phillips curve is now a standard part of the Keynesian-monetarist synthesis, although modern hysteresis theories of unemployment challenge Friedman's natural rate hypothesis which denies the importance of aggregate demand factors in influencing the equilibrium rate of unemployment (see Cross 1995; 1996). Of enormous importance has been Friedman's numerous contributions which have succeeded in reminding economists that their knowledge of how the economy functions is limited. Friedman's view is that by claiming more than can be delivered economists have on too many occasions encouraged the general public 'to expect standards of performance that as economists we do not know how to achieve' (Friedman 1972). This was a lesson that monetarists themselves were to learn during the 'great velocity decline' during the 1979–82 period when the stable demand for money function began to suffer the same fate as had befallen the stable Phillips curve (see Laidler 1985; Modigliani 1988 – reprinted on pp. 247–61). As a result 'hard core' monetarism with a capital 'M' – devoted to Friedman's advocacy of a rigid monetary growth rate rule – has few remaining supporters. However, the majority of modern Keynesians recognizing the political, economic and informational constraints facing policy-makers also now accept that in practice the opportunity for frequently exploiting fiscal policy for stabilization purposes is extremely limited. In addition whatever controversies remain over aggregate fluctuations Friedman has undoubtedly won one important debate, that relating to the determinants of *sustained* inflation. A clear majority of economists and central banks emphasize the rate of growth of the money supply when it comes to explaining and combating inflation over the long run. This allows mainstream macroeconomists to attribute *temporary* bouts of inflation to non-monetary causes such as supply shocks.

During the 1970s theoretical developments in macroeconomics were dominated by the new classical school. The contributions of Lucas and his associates cast further doubt on the mature synthesis model even when modified to incorporate the expectations-augmented Phillips curve.

THE CHALLENGE OF RATIONAL EXPECTATIONS AND NEW CLASSICAL MACROECONOMICS

During the 1970s the new classical approach to macroeconomics replaced monetarism as the main rival to Keynesianism. Underlying the approach, which is often taken to be synonymous with the work most notably of Robert Lucas, Thomas Sargent, Robert Barro, Edward Prescott and Neil Wallace, is the joint acceptance of three main sub-hypotheses. First, the rational expectations hypothesis which is associated with the work of John Muth in the context of microeconomics. In his seminal article Muth (1961)

suggested 'that expectations since they are informed predictions of future events are essentially the same as the predictions of the relevant economic theory'. In the Muthian version of the rational expectations hypothesis which has been incorporated into new classical models, economic agents' subjective expectations of economic variables will coincide with the true or objective mathematical conditional expectations of those variables, with the crucial implication that economic agents will not form expectations which are *systematically* wrong over time. Second, new classical models are Walrasian in that all observed outcomes are viewed as 'market-clearing' at each point of time, given the assumption that markets continuously clear all possible gains from trade have been exploited and utility has been maximized. Third, new classical models incorporate an aggregate supply hypothesis based on two orthodox microeconomic assumptions, namely that (1) rational decisions taken by workers and firms reflect optimizing behaviour on their part and (2) the supply of labour by workers, and output by firms, depends upon relative prices. The new classical approach to aggregate supply derives from the highly influential work of the 1995 Nobel Laureate Robert Lucas (1972, 1973). This work has given rise to the so-called Lucas 'surprise' supply function (in effect a restatement of the expectations-augmented version of the Phillips curve) where output deviates from its natural level only in response to errors in price (inflation) expectations (see Blanchard 1990).

By combining the Friedman-Phelps natural rate hypothesis with the assumption of continuous market clearing and the rational expectations hypothesis, Lucas was able to demonstrate rigorously how a short-run Phillips curve would result if inflation was unanticipated due to incomplete information. Since a short-run trade-off between a *real* variable (unemployment) and a *nominal* variable (inflation) breaks the classical dichotomy, the work of Lucas was crucial in that it demonstrated that the classical model is compatible with the Phillips curve phenomena providing the assumption of perfect information is abandoned. By invoking the Lucas aggregate supply hypothesis monetary shocks can have a *temporary* influence on real variables, that is unanticipated money is non-neutral. Within this framework Lucas (1975, 1977) was able to develop an *equilibrium* monetary explanation of the business cycle.

During the 1970s it would be no exaggeration to say that there was a 'rational expectations revolution' (Taylor 1989). The combination of the rational expectations, continuous market clearing and aggregate supply hypotheses within new classical models produces six highly controversial policy implications. The first of these, the policy ineffectiveness proposition, was initially presented in two influential papers by Thomas Sargent and Neil Wallace (1975, 1976). As 'forward-looking' rational economic agents will take into account any 'known' monetary rule in forming their expectations, new classical models predict that the authorities will be unable to influence output and employment even in the short run by pursuing a

systematic monetary policy. Furthermore any attempt to affect output and employment by random or non-systematic monetary policy will, new classicists argue, only increase the variation of output and employment around their natural levels. Second, in contrast to both Keynesianism and monetarism the new classical approach implies that as long as announced monetary contraction is believed to be credible, rational economic agents will immediately revise downwards their inflation expectations enabling the authorities to engineer painless disinflation (see Blackburn and Christensen 1989). Only where policy announcements lack credibility will inflation expectations fail to fall sufficiently to prevent the economy from experiencing output/employment costs. Third, closely related to the importance of policy credibility is the problem of dynamic time-inconsistency first highlighted by Finn Kydland and Edward Prescott (1977) in support of monetary policy being conducted by rules rather than discretion. The problem can be illustrated as follows (see Fischer 1990). Suppose the authorities announce a policy of monetary contraction to reduce inflation. If the policy is believed and economic agents revise downwards their inflation expectations then authorities who are not bound by a fixed monetary growth rate rule will have an incentive to cheat or renege on their announced policy in order to reduce unemployment. In circumstances where the authorities have such discretionary powers, and have in consequence an incentive to cheat, the credibility of announced policies will be significantly weakened. Since the difficulty of gaining credibility derives from the authorities having discretionary powers with respect to monetary policy the problem could be overcome by transferring the responsibility of anti-inflation policy to an independent central bank. Fourth, associated with the work of Robert Barro (1974; 1989 – reprinted on pp. 314–33) is the highly controversial Ricardian debt equivalence theorem limiting the usefulness of tax changes as a stabilization instrument. According to this theorem a bond-financed tax cut will leave consumption unchanged as the private sector will fully anticipate the future tax liability required to meet interest-payments on, and repayment of, the debt. The fifth main policy implication of the new classical approach concerns what policies the authorities should pursue if they wish to increase output/reduce unemployment permanently. Given that changes in output and employment are held to reflect the equilibrium supply decisions of firms and workers, given their perceptions of relative prices, it follows from this view that the appropriate policy measures to increase output and reduce unemployment are those that increase the microeconomic incentives for firms and workers to supply more output and labour. The final implications of the new classical approach for the formulation of macroeconomic policy concerns what is known as the ‘Lucas critique’ of econometric policy evaluation after the title of Robert Lucas’s (1976) seminal paper in which the proposition first appeared. Lucas concluded that macroeconometric models should not be used to predict the consequences of alternative policies since the parameters of such models

may change as economic agents adjust their expectations and behaviour to the new policy environment.

Despite the enormous influence of these and other developments, by about 1980 the Barro-Lucas-Sargent-Wallace monetary surprise explanation of the business cycle had reached both a theoretical and empirical impasse. On the theoretical front the implausibility of the assumption relating to informational confusion was widely recognized (Tobin 1980). New classical theorists argue that *nominal* rigidities are implausible in a world of rational agents who will always exhaust the opportunities for mutually beneficial trade (see Barro 1979). With sticky prices ruled out on methodological grounds new classical models were left without an acceptable explanation of the business cycle involving money to output causality. On the empirical front while early work, in particular the seminal papers by Robert Barro (1977, 1978) seemed to support the policy ineffectiveness proposition, subsequent studies most notably by Frederic Mishkin (1982) and Robert Gordon (1982) found evidence that suggested that both unanticipated and anticipated monetary policy affects output and employment. The depth of the recessions in both the USA and UK in the 1980–2 period following the Reagan and Thatcher deflations provided further ammunition to the critics. In addition opponents of the new classical approach drew attention to aggregate price and money supply data which are readily available to economic agents at a relatively low cost and questioned how this could be reconciled with the magnitude and length of actual business cycles supposedly caused by incomplete information. These criticisms led a number of economists who were sympathetic to the new classical approach to develop a mark II version which, while maintaining the assumptions of rational expectations and continuous market clearing, has reverted to a full information assumption relating to monetary developments and views business cycles as being predominantly caused by persistent real (supply-side) shocks rather than monetary (demand-side shocks) to the economy. Leading exponents and/or contributors to the so-called real business cycle approach include John Long, Charles Plosser, Robert Barro, Robert King, Finn Kydland and Edward Prescott.

THE REAL BUSINESS CYCLE APPROACH TO ECONOMIC FLUCTUATIONS

During the 1970s, with the rebirth of interest in business cycle research, economists became more involved with research into the statistical properties of economic time series. One of the main problems in this work is to separate trend from cycle. The conventional approach has been to imagine that the economy evolves along a path reflecting an underlying trend rate of growth described by Solow's neoclassical growth model (Solow 1956). This approach assumes that the supply determined long-run trend component of GDP is smooth with short-run fluctuations about trend being primarily

determined by demand shocks. This conventional wisdom was accepted by Keynesian, monetarist and new classical economists alike until the early 1980s. The demand-shock models of all three groups interpret output deviations from trend as *temporary*. Whereas Keynesians such as James Tobin (1987) feel that such deviations could be severe and prolonged and therefore justify the need for corrective action, monetarists, and especially new classical economists, reject the need for activist stabilization policy having greater faith in the equilibrating power of market forces. Nelson and Plosser's (1982) important paper challenged this conventional wisdom. The research of Nelson and Plosser into macroeconomic time series led them to conclude that

macroeconomic models that focus on monetary disturbances as a source of purely transitory fluctuations may never be successful in explaining a large fraction of output variation and that stochastic variation due to real factors is an essential element of any model of macroeconomic fluctuations.

Nelson and Plosser reached this important conclusion because in their research into US data they were unable to reject the hypothesis that GDP follows a random walk. Nelson and Plosser argue that most of the changes in GDP that we observe are *permanent* in that there is no tendency for output to revert to its former trend following a shock.

These findings of Nelson and Plosser have radical implications for business cycle theory. If shocks to productivity growth due to technological change are frequent and random then the path of output following a random walk will exhibit features which resemble a business cycle. In this case however *the observed fluctuations in GDP are fluctuations in the natural (trend) rate of output not deviations of output from a smooth deterministic trend*. What looks like output fluctuating around a smooth trend is in fact fluctuations in the trend itself due to a series of permanent shocks with each permanent productivity shock determining a new growth path. Whereas following Solow's seminal work economists have traditionally separated the analysis of growth from the analysis of fluctuations, the work of Nelson and Plosser suggests that the economic forces determining the trend are not different from those causing fluctuations. *Since permanent changes in GDP cannot result from monetary shocks in a new classical world because of the neutrality proposition embedded in the natural rate hypothesis the main forces causing instability must be real shocks*. Nelson and Plosser interpret their findings as placing limits on the importance of monetary theories of the business cycle and that real disturbances are likely to be a much more important source of output fluctuations. If there are important interactions between the process of growth and business cycles then the conventional practice of separating growth theory from the analysis of fluctuations is illegitimate. By ending the distinction between trend and cycle, real business cycle theorists have begun to integrate the theory of growth and fluctuations

(see Kydland and Prescott 1982). Hence the basic real business cycle model is a stochastic dynamic equilibrium growth model.

The starting-point of the real business cycle approach (see Plosser 1989 – reprinted on pp. 396–424; Stadler 1994) is the assumption that the economy is subjected to random supply-side shocks, most notably large random fluctuations in the rate of technological progress. These large and random shocks to the production function result in fluctuations in relative prices to which rational economic agents respond. According to this approach observed fluctuations in output and employment are equilibrium phenomena and are the outcome of rational economic agents responding optimally to unavoidable changes in the economic environment. For example the approach controversially assumes that fluctuations in employment reflect voluntary changes in the amount of labour people wish to supply. As fluctuations in output and employment are seen as Pareto efficient responses to shocks to the production function the approach implies that monetary policy is irrelevant in explaining such fluctuations (see Van Els 1995). However, the main policy implication of the approach is that because the existence of fluctuations in GNP do not imply the failure of markets to clear and are instead regarded as fluctuations in the natural (trend) rate of output, the government should not attempt to reduce these fluctuations through stabilization policy not only because such attempts are unlikely to achieve their desired objective, but also because reducing instability would reduce welfare (see Prescott 1986 – reprinted on pp. 366–88). While monetary policy has no real effects, the government could do a great deal of harm if its taxation and spending policies distorted output and employment from the optimal amounts chosen by firms and workers. Needless to say the approach is highly controversial and has been subjected to a number of criticisms (see Summers 1986 – reprinted on pp. 389–95; Mankiw 1989 – reprinted on pp. 425–36). One final feature of the approach worth noting is that concerning the development of the calibration method. Rather than attempting to provide models capable of conventional econometric testing, real business cycle theorists have instead developed the calibration method in which the simulated results of their specific models (when hit by random shocks) in terms of key macroeconomic variables are compared with the actual behaviour of the economy. Real business cycle theory therefore represents a specific approach to macroeconomic modelling (see Lucas 1980; Danthine and Donaldson 1993).

NEW KEYNESIAN ECONOMICS

The third approach which has dominated the more recent development of macroeconomics is new Keynesian economics. Since the mid-1980s the new Keynesian school has emerged as the main rival to the new classical approach. Leading exponents and/or contributors to the approach include Gregory Mankiw, Olivier Blanchard, George Akerlof, Janet Yellen, David

Romer, Joseph Stiglitz and Bruce Greenwald. While most new Keynesian analysis incorporates the rational expectations and natural rate hypotheses, it does *not* incorporate the new classical assumption of continuous market clearing. Indeed the central focus of one important strand of the burgeoning new Keynesian literature has been to explore a variety of reasons for wage and price stickiness that prevent market clearing. This has involved research into the causes of (1) nominal wage stickiness (e.g. via overlapping long-term wage contracts); (2) nominal price stickiness (e.g. arising from menu or adjustment costs faced by monopolistically competitive firms); (3) real rigidities in both the labour market (e.g. via efficiency wage, insider–outsider and implicit contract models) and product market (e.g. via customer markets); and (4) co-ordination failures (see for example Gordon 1990 – reprinted on pp. 478–551; Mankiw and Romer 1991; D. Romer 1993).

One problem with the new Keynesian developments is that there is no single new Keynesian model, rather the research programme has led to a multiplicity of explanations of wage and price rigidities, and their macroeconomic consequences. Although the numerous explanations to be found in the literature are not necessarily mutually exclusive and often complement each other, it is the case that different economists within the new Keynesian research programme emphasize various aspects and causes of market imperfections and their macroeconomic consequences (see Stiglitz 1992). Bearing this in mind we draw attention to three policy implications that derive from new Keynesian analysis. First, in new Keynesian models which emphasize wage and price stickiness money is no longer neutral and policy effectiveness is re-established. For example, Stanley Fischer (1977) and Edmund Phelps and John Taylor (1977) have shown that nominal demand disturbances are capable of producing real effects in models incorporating rational expectations providing the new classical assumption of continuous market clearing is abandoned. In such models systematic monetary policy can help stabilize the economy. Second, the gradual adjustment of prices and wages in new Keynesian models implies that any policy of monetary disinflation, even if credible and anticipated by rational economic agents, will lead to a substantial recession (sacrifice ratio) in terms of output and employment. Furthermore in some new Keynesian analysis the equilibrium rate of unemployment is affected by the path taken by the actual rate of unemployment so that the natural rate is affected by the aggregate demand (see Cross 1996). In circumstances where unemployment remains above the natural rate for a prolonged period the natural rate itself will tend to increase due to so-called hysteresis effects. Not only will those who are unemployed suffer a deterioration of their human capital (skills) exacerbating the problem of structural unemployment, but the number of long-term unemployed is also likely to increase. In the latter case it is claimed that such outsiders exert little influence on wages and are unable to price their way back into jobs, and as a result the natural rate of unemployment rises.

Such hysteresis effects provide new Keynesians with a strong case to boost aggregate demand during a protracted recession. While monetarism and new classical macroeconomics undermined the case for 'fine' tuning, new Keynesians have championed the case for 'rough' or 'course' tuning where policies are designed to offset or avoid the more serious macro-level problems. Lastly, contrary to the new classical approach, new Keynesian analysis has provided a rationale for the existence of *involuntary* unemployment as an equilibrium phenomenon. For example, in efficiency wage models (see Yellen 1984) firms are reluctant to cut wages even in the face of an excess supply of labour (persistent unemployment) since such a policy would be counter-productive as lower efficiency/productivity would result. In summary the bulk of new Keynesian research has sought to develop models with coherent microfoundations, in order to explain why prices and wages adjust only gradually, and in doing so have sought to re-establish a case for policy effectiveness and justify interventionist policies (both supply and demand – management policies) to stabilize the economy. However, it should be noted that a second strand of new Keynesian work demonstrates how money is not neutral even if prices and wages are perfectly flexible (see Greenwald and Stiglitz 1993 – reprinted on pp. 552–74). Greenwald and Stiglitz follow Keynes (1936) and argue that increasing price flexibility could well be destabilizing.

THE RENAISSANCE OF ECONOMIC GROWTH ANALYSIS

The causes of the enormous differences in living standards across time and space have long been of interest to economists. Since rising living standards depend in the long run on economic growth it is extremely important for economists to understand and quantify this process. The consequences of even small differences in growth rates when compounded over time, are striking. The example provided by Barro and Sala-i-Martin (1995) clearly brings this point out. The 1.75 per cent growth rate of real per capita income in the USA between 1870 and 1990 enabled real GDP per head to rise from \$2,244 to \$18,258. If the growth rate had been 0.75 per cent over the same period, income per capita would have risen to \$5,519. However, if the growth rate had been 2.75 per cent the real income per person in 1990 would have been an astonishing \$60,841! While short-run fluctuations in output have important welfare consequences (in the opinion of the majority of mainstream economists) it is evident that 'the welfare implications of long-run growth swamp any possible effects of the short-run fluctuations that macroeconomics traditionally focuses on' (D. Romer 1996). As we have seen Keynesian, monetarist and new classical analysis was primarily concerned with trying to understand short-run instability of output, employment and the price level. Some prominent macroeconomists now seem to regard these previous efforts as perhaps misguided given that the economic instability since the second world war has been a relatively 'minor

problem' (Lucas, 1987 p.30). Barro and Sala-i-Martin (1995) are more forceful and are worth quoting:

if we can learn about government policy options that have even small effects on the long-term growth rate, then we can contribute much more to improvements in standards of living than has been provided by the entire history of macroeconomic analysis of countercyclical policy and fine-tuning. Economic growth...is the part of macroeconomics that really matters.

Given the importance of economic growth it is surprising that economists' interest in the theoretical and empirical issues relating to the causes and consequences of growth has itself been cyclical. Dynamic issues were of major concern to the classical economists who sought to understand the nature and causes of the 'Wealth of Nations'. But following the 'marginalist revolution' in the 1870s neoclassical economists turned the focus of their attention towards problems associated with static microeconomic issues relating to the efficient allocation of resources. With the onset of the Great Depression and the subsequent Keynesian revolution, economists quite understandably switched their interest towards the causes of short-run aggregate instability. However, some notable Keynesian economists (e.g. Hansen) feared that the Great Depression represented more than a severe example of a business cycle downswing. Rather it was feared that there may be a long-run tendency for capitalist economies to produce an actual rate of growth less than the underlying growth of productive potential. Hansen's stagnation thesis was an important contributing factor leading to a reawakening of interest in long-run issues in the post-war period (for a discussion of the stagnation thesis see Ackley 1966: Chapter 18).

Between 1956 and 1970 economists refined and developed the Solow-Swan neoclassical growth model (see Solow 1956; 1957; Swan 1956). But thereafter, until the mid-1980s macroeconomic research was predominantly concerned with business cycle issues in the wake of the 1973 oil shocks and theoretical developments which absorbed the rational expectations hypothesis into macroeconomic analysis. Following the contributions of Paul Romer (1986) and Robert Lucas (1988) the study of economic growth has once again become a vibrant research area. In 1996 the first issue of a new *Journal of Economic Growth* was launched and many well-known macroeconomics textbooks now have their discussion of economic growth at the beginning rather than at the end of the text (see Mankiw 1994; D. Romer 1996). Economic growth has returned as an active research area and is central to contemporary macroeconomics.

The essential starting-point to any discussion of economic growth is the Solow growth model which has as its centrepiece the standard neoclassical production function (see Solow 1994 – reprinted on pp. 649–59). This well-known framework illuminates how growth of the capital stock and labour force interact with technological progress to produce more output. Given a

Cobb-Douglas production function with diminishing returns to factors and constant returns to scale, economic growth is the result of changes in both the quality and quantity of factor inputs. Household savings are converted via investment into a higher capital stock which generates growth of output. However because of diminishing returns the marginal product of capital declines as the capital-labour ratio rises. The accumulation of reproducible inputs contributes less and less to growth and will approach zero unless population growth and technological change allow the quality and quantity of non-reproducible factors to rise. In Solow's model the long-run rate of growth is driven by the exogenous factors of labour force growth and technological progress and is independent of the rate of investment. A change in the savings rate can have only a temporary effect on growth although the savings rate does influence the *level* of output per head. The growth of long-run *income per head* depends on total factor productivity which is driven by *exogenous* improvements in technology. Hence long-run growth appears to be beyond the influence of government policy.

A striking implication of the Solow model is that if technical progress is regarded as a public good and freely available to all countries, rich and poor, there should be no cross-country divergence of growth rates of income per capita. Differences in the *level* of per capita income result from variations in the capital-labour ratio. Hence countries with low initial incomes per capita due to low capital-labour ratios have the potential for rapid growth which will allow them to *catch up* the high income countries. This *convergence hypothesis* is conditional on the underlying determinants of the steady state (see Abramovitz 1986 – reprinted on pp. 582–603; Baumol 1986). The empirical evidence on the extent of convergence suggests that this process has been present among some industrialized countries but apart from a limited number of 'star' performers (particularly in East Asia) the convergence between developed and developing countries has been limited or absent. As a result there is growing evidence of widening disparities of income across the world's economies (see Dowrick 1992 – reprinted on pp. 604–15).

Given the absence of convergence when a broad sample of countries are considered a number of theorists, notably P. Romer (1986) and Lucas (1988), have developed growth models where two essential assumptions of the Solow model are abandoned, namely that technological change is exogenous and that all countries have the same access to technological opportunities (see P. Romer 1994 – reprinted on pp. 628–48). These endogenous theories of growth have dominated the new literature since the mid-1980s (see Van de Klundert and Smulders 1992; Pack 1994). In some models of endogenous growth there are constant returns to broad capital accumulation and investment in physical and human capital can permanently raise the growth of output per head. Other models stress endogenous innovation and reject the idea of a universally available technology. In this case poor countries may fail to catch up the leading countries because of 'idea gaps'

rather than 'object gaps' (see P. Romer 1993; Crafts 1996). Lucas (1993) has argued that 'the main engine of growth is the accumulation of human capital – of knowledge – and the main source of differences in living standards among nations is differences in human capital'. Endogenous growth theory also gives rise to important policy implications which imply that governments can influence the long-run growth rate (see Shaw 1992 – reprinted on pp. 616–27).

CONCLUSION

Since the mid-1930s there has been considerable progress in our understanding of macroeconomic phenomena. Following the monetarist contributions a consensus of economists now accept that sustained inflation is a monetary phenomenon. New classical theory has produced numerous insights with respect to the role and conduct of stabilization policy. Real business cycle theorists have caused everyone to rethink basic issues associated with economic fluctuations. The insights provided by new Keynesian economists have transformed the microfoundations of the supply side of models which stress the importance of aggregate demand disturbances in explaining aggregate instability. Finally economists are once more producing valuable research into the causes of economic growth. In the chapters which follow we hope the reader can capture some of the excitement which has been a constant feature of the controversies which have characterized macroeconomics since Keynes first stimulated its development.

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