

A tribute to Basil J. Moore and an introduction to *Complexity, Endogenous Money and Macroeconomic Theory*

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During a long and distinguished academic career, spent largely at Wesleyan University in Connecticut (but during which he has maintained a long-standing association with the University of Stellenbosch in South Africa, where he is now Professor Extraordinary of Economics), Basil Moore has made numerous important contributions to macroeconomics and monetary economics. One indication of his considerable impact as a scholar can be found in Bodenhorn's (2003) recent study of scholarship at elite liberal arts colleges, wherein Moore is ranked fifth in terms of total citations amongst all Full Professors at the top 50 liberal arts colleges in the USA. His books and articles cover a broad range of topics, including the accounting relationship between aggregate saving and investment, the destabilizing effects of wage and price flexibility and the case for the abolition of exchange rates – to name the subject matter of but three of his recent publications. Most notably, Moore is renowned for his contributions to monetary economics and, in particular, as the progenitor of the 'horizontalist' analysis of endogenous money. According to the horizontalist view, the volume of credit – and, by extension, the size of the money supply – is driven by the demand for bank loans by creditworthy borrowers, a demand that, given the price charged by the central bank for borrowing reserves, is accommodated by commercial banks at a fixed interest rate of their own making. Moore's horizontalism is perhaps best exemplified by his pioneering 1988 book *Horizontalists and Verticalists: The Macroeconomics of Credit Money* (Cambridge University Press). Several of the debates initiated by this book – including those concerning the precise ways in which the financial sector and the money supply respond to the growth of nominal income, and whether or not these responses are accompanied by increases in interest rates – are still in progress.

Always skeptical of the usefulness of equilibrium analysis, Moore has, more recently, embraced complexity theory and the insights of contemporary

contributions to macroeconometrics that have highlighted the seeming ubiquity of unit roots in macroeconomic time series. His desire to integrate the visions of complexity analysis and modern time series macroeconometrics into macroeconomic and monetary theory is part of an ongoing effort to reconcile economic analysis with the flux of history and, in the process, to understand macroeconomics as an evolving, path-dependent process. The fruits of this synthesis can be found in his recently published – and eagerly anticipated – book, *Shaking the Invisible Hand: Complexity, Endogenous Money and Exogenous Interest Rates* (2006).

Apart from publishing a large number of influential books and articles, Moore has held visiting positions at universities around the world, including Yale, Stanford, Cambridge and both the University of British Columbia and Simon Fraser University in his native Canada. He has also acted as a consultant for governments and government agencies in the US, Morocco and Malaysia. What these various facts and accomplishments do not reveal, however, is perhaps the single most laudable feature of Moore's career: the spirit of openness and inquiry that characterizes his scholarship. His continual and ongoing efforts to engage and persuade those with whom his views differ, whilst simultaneously subjecting his work to maximum exposure to critical scrutiny by his peers, are typical of a scholar whose interests and motivations lie purely in the development and advancement of ideas, and are a model of enlightened scholarly activity.

The purpose of this book is to celebrate Basil Moore's career and, in particular, his interests in and contributions to monetary theory, macroeconomics, and complexity analysis. It features 21 essays by internationally renowned authors writing from a Post Keynesian perspective. The structure of the volume borrows from the contents of Moore's own (and aforementioned) book, *Shaking the Invisible Hand: Complexity, Endogenous Money and Exogenous Interest Rates* (2006), by emphasizing five distinct but interrelated themes: basic economic concepts, tools and methodology; complexity, uncertainty and path dependence; the macroeconomics of endogenous money; the macroeconomics of exogenous interest rates; and unemployment, inflation and the determination of aggregate income. A separate section of the Festschrift is devoted to each of these themes. In this way, it is hoped that the resulting book is truly representative of the interests and contributions of the honoree, making it a book that is both *for* Professor Moore and one that is *about his work* – work that continues to raise questions about economic methodology, the workings of the macroeconomy and the proper conduct of monetary policy that inspire his students and colleagues, and that are of paramount importance to professional economists and policy makers alike.

ECONOMIC CONCEPTS, TOOLS AND METHODOLOGY

Part I of the book features two chapters that discuss basic economic concepts, tools and methodology. The premise of Claude Gnos's chapter is that accounting identities – contrary to popular belief – make important contributions to economic knowledge. This he demonstrates with respect to three key debates in macroeconomics, concerning the endogeneity of money, the relationship between saving and investment, and the status of the expenditure multiplier.

Addressing the first of these debates, Gnos first highlights the different interpretations accorded to the relationship between credit money and bank deposits by Basil Moore on one hand, and the circuitist school on the other. He then shows how these differences can be resolved by appropriate analysis of the process of monetary exchange using the principles of double-entry bookkeeping.

Gnos then turns to the relationship between saving and investment and the question as to whether or not it is ever meaningful to think of the amounts of aggregate investment and saving as being unequal. Using double-entry bookkeeping, he shows that there exists an important distinction between investment in circulating capital and investment in fixed capital and that on this basis, it is possible to reconcile the idea that saving and investment are identical with the notion that the amounts of saving and investment may be unequal.

Finally, Gnos analyzes the multiplier process and its purported role in equating planned saving and investment through the gradual adjustment of income. Gnos argues that the appropriate treatment of saving and investment through double-entry bookkeeping supports Moore's view (see, for example, Moore, 1994) that the multiplier relationship does not arise as a result of successive adjustments in income gradually equating saving and investment, as traditionally conceived.

Steve Keen begins his chapter by noting with approval Basil Moore's concern that economic outcomes are properly viewed as resulting from processes in real time (rather than timeless equilibration mechanisms), of which money is an intrinsic and essential feature (rather than an afterthought in what would otherwise function equally well as a barter system). Anticipating many of the sentiments of the chapters in the second part of the book, Keen argues that this 'process view' in which 'money matters' has made gains in recent years, as economics has become increasingly influenced by concepts from complexity theory. But he cautions that the 'timeless barter' view of the economy has an unfortunate habit of reasserting itself – sometimes in places where it might be least expected. Keen

illustrates this latter point with reference to the work of the circuitist school and, in particular, Graziani (1989). Ostensibly committed to the process view in which money matters, Keen shows how, by degrees, Graziani misses opportunities to model the economy as an evolving dynamic process and instead slips back into a timeless equilibrium analysis in which money is irrelevant.

Keen goes on to argue that in order to avoid lapses of this nature without giving up hope of formal modelling, non-neoclassical economists sympathetic to the process view of the economy must begin to adopt methods of analysis developed in engineering, physics and computing, disciplines that have never suffered the fetish with equilibrium analysis that is characteristic of mainstream economics. He illustrates this point by drawing attention to the value of systems engineering software and of direct numerical solutions to differential equations as means of identifying and solving flaws in Graziani's circuitist model and illustrating the workings of Goodwin's (1967) predator-prey growth cycle model.

COMPLEXITY, UNCERTAINTY AND PATH DEPENDENCE

The second part of the book comprises several chapters on the theory and application of the concepts of complexity, uncertainty and path dependence. Richard Day begins with an exploration of the development of complexity theory in the physical sciences and its capacity to illuminate the workings of the social realm. Day first establishes that the basic theory of economic decision making is ripe for the application of complexity analysis – as long as the former is understood as describing purposive, deliberative behavior by contemplative agents, and not as a theory of instantaneous global optimization incorporating rational expectations in an environment of perfect information. Day argues that his preferred process view of economic behavior has a long tradition in economics – it is evident in the work of Cournot, Walras and Marshall – and has been kept alive ever since in the work of, for example, Simon, Winter and various macroeconomists inspired by the work of Keynes.

The problem that remains is to describe how economic systems populated by such contemplative decision makers function as a whole – the 'disequilibrium existence problem' as Day calls it. The secret, he suggests, lies in the analysis of stock-flow mechanisms inherent in such processes as inventory adjustment and fluctuations in the accumulation of monetary assets and liabilities. Ultimately, he envisages such analysis as giving rise to a process view of the economy in which markets and banks constitute

adjustment processes, intermediating the out-of-equilibrium behavior of households, firms and governments.

The basic argument developed by J. Barkley Rosser, Jr. is that complexity theory provides a foundation for Post Keynesian economics and, in particular, for the concept of fundamental uncertainty that is central to Post Keynesianism. Rosser begins with a 'big tent' definition of complexity that embraces the 'four C's': cybernetics, catastrophe theory, chaos theory and 'small tent' complexity. He then shows how complexity analysis so-defined can help articulate and/or provide foundations for many of the most important concerns of the three 'strands' of Post Keynesianism (the fundamentalist Keynesian, neo-Ricardian and Kaleckian strands) originally identified by Hamouda and Harcourt (1988). Rosser also shows how complexity can complement and undergird ideas associated with Post Keynesianism that are not, in and of themselves, Post Keynesian in origin – such as hysteresis and evolutionary economics. Finally, Rosser considers the relationship between complexity and two of the central tenets of Basil Moore's macroeconomics: the claim that there is no useful role for equilibrium in economic analysis; and the notion that economic systems are open and evolutionary. Rosser argues that both of these tenets are *consistent with* complexity analysis, but expresses ambivalence as to whether or not they are *necessarily implied* by such analysis.

In the first of two more applied chapters, Jerry Courvisanos and Colin Richardson use complexity theory as a basis for modelling a Post Keynesian theory of the cycle, according to which fluctuations in investment expenditures both: (a) drive the demand-led aggregate fluctuations of the economy; and (b) cause fluctuations in the 'susceptibility' of the investment process, by affecting the illiquidity of firms and hence their exposure to the pitfalls of fundamental uncertainty. The latter process, it is argued, has feedback effects on the volume of investment spending itself that can eventually bring upswings and downswings in economic activity to an end.

Courvisanos and Richardson first outline the concept of investment susceptibility and its role as a 'filter' in the investment decision between the objective determinants of investment (including profitability, firms' gearing ratios and the rate of capacity utilization) and actual investment spending by firms. The authors next construct a formal model of investment-driven growth, demonstrating by means of numerical analysis that any departure of this model from its steady state results in endogenously generated and self-perpetuating growth cycles. It is then shown that introducing susceptibility into the investment function increases the economy's 'corridors of viability' – that is, the range within which real output can fluctuate without these fluctuations becoming explosive or chaotic. Since this increases the model's plausibility as a representation of the reality it is intended to

imitate, Courvisanos and Richardson argue that their analysis lends support to the Post Keynesian view that the investment process is susceptible as a result of its exposure to fundamental uncertainty. They conclude by highlighting the policy implications of their analysis, which include the recommendation that public authorities seek to deliberately narrow the economy's 'corridor of viability' in an effort to limit the amplitude of the business cycle.

Mark Setterfield's chapter serves as a precursor to some of the themes explored in detail in Parts III and IV, but its principal focus is the importance of modelling in path-dependent terms, and the possibility of approaching and shedding light on an old debate in monetary economics (horizontalism versus structuralism) by examining it through the lens of the 'history versus equilibrium' debate in macrodynamics. The chapter first develops a 'shifting equilibrium' model of effective demand which describes aggregate economic activity as an evolutionary sequence of outcomes arising from the recursive interaction of short- and long-term expectations. It is shown that in the context of this model, changes in the financial fragility of the non-bank private sector coupled with the possibility of commercial banks making discretionary responses to these changes together give rise to a dynamic credit supply schedule that is path dependent. In particular, the shape of this 'Moorian' credit supply schedule cannot be identified as either horizontal or upward sloping *a priori*, but may turn out to be either in practice. It is argued that the Moorian credit supply schedule is an important step towards narrowing the differences between horizontalism and structuralism, and that it also helps to make sense of the claim that the horizontal credit supply schedule is not a special case.

THE MACROECONOMICS OF ENDOGENOUS MONEY

Part III is devoted to discussion of perhaps the single most important idea with which Basil Moore's work is associated: the theory of endogenous money. Paul Davidson begins with a discussion that focuses on the fundamental debate as to whether changes in the money supply are properly regarded as an exogenous cause of changes in nominal income (as, for example, in monetarism) or an endogenous effect of changes in nominal income (as argued by Moore and as is now widely accepted by central bankers and in most modern macroeconomics). Davidson seeks to clarify this debate by distinguishing between the *interest elasticity* and the *stability* of the money supply function. He argues that a necessary condition for the monetarist view of money as an exogenous cause is that the money

supply function be perfectly interest inelastic. Basil Moore's horizontalism – which posits a perfectly interest *elastic* money supply function – establishes that money is an endogenous effect precisely by virtue of its departure from the necessary elasticity condition implicit in the monetarist position.

Davidson then goes on to argue that a money supply function that is at least somewhat interest elastic is, in fact, essential to the income generating process in a monetary production economy, in which entrepreneurs must contract ahead for factor services and must also pay factors for their services before output has been produced, goods sold, sales revenues raised and profits realized. In this environment, an elastic supply of money is essential in order to finance expansions in economic activity before the additional income that will accrue from such expansions has been generated.

Davidson concludes by warning that accommodating the finance-demands of the private sector, whilst essential to the expansion of real income, can also succeed in accommodating competing claims on a *fixed* real income, thus facilitating inflation. The problem, he argues, is that the banking sector (including the central bank) cannot clearly distinguish between *which* process – inflation or real expansion – they are being asked to finance. Hence the use of monetary policy to control inflation always risks limiting real expansion to rates that are below potential.

While rejecting the notion of an exogenous money supply, Otto Steiger's chapter questions whether the money supply is *completely* endogenous, arguing that central banks retain some power to exogenously control the quantity of money in circulation. The fundamental premise of Steiger's argument is that in order to borrow from the central bank, commercial banks must both (a) promise to pay interest, and (b) provide good security. The latter requirement, he argues, is frequently overlooked in contemporary discussions of central banking, but has a crucial bearing on the endogeneity of money. This is because a central bank's capacity to create its own money is limited by the extent of its accumulated capital. Central banks cannot, Steiger argues, create unlimited quantities of central bank money without threatening their own solvency. By setting a limit on the capacity of the central bank to create high-powered money, the central bank's capital, by extension, sets a limit on the extent to which the money supply can be considered endogenous. Steiger proceeds to illustrate this theory of the less-than-completely-endogenous money supply with reference to the monetary policy operations of the Eurosystem (the European Central Bank and the various national central banks of the European Monetary Union member nations).

Written by a self-professed, unreconstructed horizontalist, the purpose of the chapter by Louis-Philippe Rochon is to defend and further develop

several specific features of the horizontalist theory of the endogenous supply of credit money. Rochon begins by revisiting the structuralism versus horizontalism debate and, in particular, the claims that both commercial banks and central banks play an entirely passive role in the money creation process in horizontalism. Rochon rejects these claims, arguing in the first instance that horizontalists only ever claimed that commercial banks meet the demand for loans (at any given rate of interest) from *creditworthy* borrowers. Commercial banks are thus *active* in the money creation process, both determining and applying the standards of creditworthiness. As regards the central bank, Rochon argues that full and automatic ‘accommodationism’ is *not* an accurate description of the horizontalist position – although such behaviour ought to be regarded as the *general* case, since: (a) maintaining the liquidity of both individual banks and the banking sector as a whole is paramount amongst central bank functions; and (b) departures from full accommodationism will change interest rates, an important but relatively infrequent purpose of central bank behavior.

Having re-established these first principles of horizontalism, Rochon then turns to the task of further developing the horizontalist theory of credit supply. He argues that any such further development must focus on the evolution of the fundamental constraint on borrowers that is created by the assessment of their creditworthiness. This, in turn, is influenced by both ‘microuncertainty’ (uncertainty about the future prospects of individual borrowers) and ‘macrouncertainty’ (uncertainty about the future prospects of the economy as a whole). Rochon argues that fluctuations in macro-uncertainty influence banks’ lending standards (and hence the ‘threshold’ criteria that define a creditworthy borrower), whereas differences in microuncertainty influence the interest rates that different creditworthy borrowers are charged. These principles furnish a Post Keynesian theory of credit rationing in an environment in which there is no literal scarcity of credit.

Peter Howells begins by demonstrating that ‘we are all endogenous money theorists now’, and suggests that for some time the only real debate in the endogenous money literature has concerned refinements of the basic theory. The rest of his chapter is then devoted to discussion of one such refinement, concerning the question as to who *holds* the money that is endogenously generated by the loan creation process.

Howells accepts the horizontalist argument that commercial banks supply loans at a given rate of interest in response to the demand for loans from creditworthy borrowers. His concern, however, is that this horizontalist view of money creation provides no account of why, following an endogenous expansion of the money supply, there will be a corresponding

increase in the *quantity of money demanded*: someone must be willing to hold additional, loan-induced deposits in order to restore monetary equilibrium at the new, higher quantity of money in circulation. Howells rejects Moore's convenience lending explanation of why the additional money created is always willingly held, arguing that the willingness of the public to always *accept* money in the first instance does not preclude the possibility that they will subsequently seek to alter the amount of money they hold in accordance with their portfolio preferences. Some further adjustments in prices and/or quantities must occur, Howells, argues, in order to reconcile the demand for money with the available supply.

Howells then shows that, in the current environment, the most obvious mechanism for reconciling money demand with an endogenous money supply is the capacity of the private sector to 'destroy' money through the repayment of outstanding debt. This mechanism was first proposed by Kaldor and Trevithick (1981), but Howells shows that it has only recently been rendered truly plausible by the amount of unsecured lending to households, which has increased so greatly as to ensure that most households (as well as firms) now carry debt that permits discretionary repayment at no cost. An important lesson of this analysis, then, is the profound sensitivity of monetary *theory* to the institutions and practices of the monetary sector itself.

An important principle of the modern Chartalist view of endogenous money associated with authors such as Wray (1998) is the concept of 'tax-driven money' (TDM) – the idea that the state's ability to levy taxes and dictate the form in which these taxes are payable determines what circulates as money. The purpose of Mathew Forstater's chapter is to document hitherto unrecognized instances of this TDM view in the history of economic thought, economic history and the practice of economic policy making.

Forstater shows that there is clear recognition of the TDM principle in the works of Smith, Say, Mill and Marx, arguing that the latter recognized tax liabilities as being instrumental in the emergence of wage labor. Further evidence of the acceptance of the TDM view is found in the works of progenitors of neoclassical economics such as Jevons and Wicksteed, twentieth-century authors such as Abba Lerner (whose 1946 entry on 'Money' in the *Encyclopaedia Britannica* is infused with Chartalist principles and contains a concise explanation of the TDM principle) and even contemporary general equilibrium theory.

Forstater goes on to show that the cowrie currency that emerged in West Africa in the late thirteenth/early fourteenth century was TDM and not, as conventional wisdom would have it, a 'primitive' money, before demonstrating that the TDM principle was clearly understood by early US economic policy makers. He concludes by lamenting the fact that seemingly

the only literature in which there is no discussion of TDM is modern economics textbooks!

Philip Arestis and Malcolm Sawyer's chapter explores the nature and policy implications of endogenous money in both 'new consensus' macroeconomics and Post Keynesian economics. They begin by discussing the new consensus model and highlighting some of its main features: acceptance of the natural rate hypothesis; characterization of inflation as a purely demand-pull phenomenon; and emphasis on the interest rate as the instrument of monetary policy (as a result of which the quantity of money in circulation is rendered an endogenous 'residual', determined by the demand for money). The authors then critically examine the potential for using monetary policy to stabilize output at its 'natural' level in this model – the key role assigned to monetary policy in new consensus macroeconomics. Using plausible values for the responsiveness of aggregate demand to changes in interest rates, Arestis and Sawyer show that correcting a once over but permanent deviation of output from its natural value would require implausibly large changes in the real interest rate.

Arestis and Sawyer then outline an alternative, Post Keynesian macro model, in which output and employment do not automatically gravitate towards supply-determined, natural levels, inflation can emanate from cost-push sources, and money is endogenous by virtue of the very workings of the financial sector in a monetary-production economy (as a result of which manipulation of the interest rate charged for bank reserves emerges as the only plausible instrument of monetary policy). The authors show that this model has important implications for monetary policy, suggesting that the latter be conducted along lines that differ markedly from those associated with new consensus macroeconomics. In particular, the Post Keynesian model requires that the *objective* of monetary policy change to take account of its potentially lasting effects on real variables and also suggests the periodic need for credit control policies.

The chapter by Claudio Sardoni examines the impact of the information and communication technology (ICT) revolution on the financial sector. In particular, Sardoni investigates two questions central to the future conduct of monetary policy: will the ICT revolution give rise to new payment and clearing systems that impair the ability of central banks to conduct monetary policy; and will the ICT revolution ultimately render markets sufficiently close to the ideal of perfect competition to eliminate the need for monetary policy?

Sardoni concurs that ICTs could very well give rise to parallel payment and clearing systems that operate independently of the central bank. However, he argues that such developments will not undermine the capacity of the central bank to influence the economy as long as the central

bank's liability remains the economy's unit of account. Whilst it is possible in principle to envisage a situation in which the central bank's liability is displaced as unit of account, Sardoni argues that the obstacles to this are formidable – not least because the state itself can influence the process by, for example, continuing to demand payment of taxes in the form of 'traditional money' denominated in terms of the central bank's liability.

Sardoni next turns to the claim that, by improving the flow of information, ICTs may cause actual economies to converge towards the ideal of perfect competition, rendering obsolete the need for monetary policy interventions. But Sardoni argues that whilst ICTs might improve the flow of information about the present and past, they can do nothing to remedy the paucity of information about the *future* that is the crux of the pervasive problem of fundamental uncertainty. In this sense, ICTs do not present a radical change in the way that capitalist economies operate and do not, therefore, provide any basis for believing that the need for monetary policy interventions will eventually be eliminated as the diffusion of ICTs continues. Indeed, to the extent that the increased flow of information about the past and present gives rise to ever more *speculative* activity in asset markets, ICTs may even give rise to the need for a more active monetary policy designed to redress financial instability and safeguard the steady advance of the economy's income-generating process.

Marc Lavoie and Wynne Godley's contribution is part of a larger project that aims to create a stock-flow consistent Post Keynesian analysis of the interactions between money, credit, production, income and wealth. The particular focus of this chapter is the modelling of the banking sector within this larger project.

Lavoie and Godley begin by emphasizing that a crucial role of the banking sector in a Post Keynesian world is to provide a *buffer* to households and firms when (as is usually the case) expectations are disappointed. This is accomplished by providing access to previously accumulated deposits and/or through the issuance of loans.

The authors next construct simple stock-flow consistent Post Keynesian models of asset-based and overdraft financial systems, drawing attention to the fact that, in either system, the central bank supplies reserves of high-powered money to commercial banks on demand as part of an endogenous money creation process. Utilizing simulation techniques, they then demonstrate that an increase in the compulsory reserve ratio – contrary to conventional wisdom – will not reduce the money supply, although it will lead to an increase in deposit and lending rates if banks operate with a target banking liquidity ratio (measured as the ratio of Treasury bills to deposits) motivated by liquidity preference. Lavoie and Godley then discuss various extensions to their basic models of the banking sector, designed to make

the latter more realistic. They conclude by noting that their ultimate aim is not to create a canonical Post Keynesian model of the banking sector, but rather to pave the way for future research into stock-flow consistent macro models that help to draw attention to the substantially different outcomes to which the Post Keynesian conception of the banking sector gives rise, as compared to the results associated with the orthodox neoclassical theory of the banking sector.

THE MACROECONOMICS OF EXOGENOUS INTEREST RATES

In addition to emphasizing the endogeneity of the quantity of money in circulation, a second major theme of horizontalism as originally articulated by Moore (1988) is the exogeneity of the interest rate. Each of the three chapters in Part IV is focused on this horizontalist theme of external manipulation of the interest rate by the central bank.

The expressed purpose of L. Randall Wray's chapter is to consider four interrelated questions: what does it mean to say that the interest rate is exogenous; which interest rate(s) is (are) exogenous; how does exogeneity of the interest rate arise in the first place; and what are the implications of exogenous interest rates for Keynes's theory of liquidity preference and Minsky's financial instability hypothesis?

Wray adopts the convention of defining an exogenous interest rate as one that is set by government policy. The overnight, inter-bank lending rate is exogenous in this sense, he argues, but whether or not 'retail' rates should be similarly regarded as exogenous depends on the behavior of the mark-up applied to the overnight rate by banks. The point, however, is that there is room for debate about the latter without this obscuring the more fundamental claim that central banks accommodate the demand for reserves from central banks 'horizontally' at an interest rate of their own making.

Wray next investigates the circumstances under which interest rates are rendered exogenous, arguing that exogeneity is an institutional (and hence historically specific) phenomenon, rather than a logical necessity. In particular, he identifies the exchange rate regime as a key determinant of interest rate exogeneity/endogeneity, arguing that in a fixed exchange rate regime, the commercial bank is obliged to adjust the interest rate in response to the demands of international financial markets in order to protect the exchange rate peg, rendering the interest rate endogenous.

Finally, Wray shows that there is no conflict between contemporary Post Keynesian monetary theory on one hand, and either Keynes's liquidity preference theory of asset prices or Minsky's financial instability

hypothesis on the other – both of which are shown to apply in a horizontalist environment of endogenous money and exogenous interest rates.

Colin Rogers begins his chapter by noting that mainstream monetary theory has abandoned the assumption of an exogenous money supply and now explicitly regards the interest rate as the instrument of monetary policy. The question that he then poses is: do these developments signal the conversion of the mainstream to the type of monetary analysis advocated by Basil Moore in *Horizontalists and Verticalists*?

Rogers first reviews Moore's monetary analysis, noting that whilst endogenous money and exogenous interest rates are features of this analysis, so, too, are the propositions that the monetary and real sectors of the economy are inextricably entwined, and that money is non-neutral in the long run. In short, endogenous money and exogenous interest rates (horizontalism) *alone* are not sufficient to capture the full substance of Moore's monetary analysis.

Rogers then shows that the macroeconomics of the 'new horizontalists' in mainstream theory falls far short of Moore's monetary macroeconomics. The mainstream has adopted horizontalism merely as a practical solution to the problem that any assumption to the effect that central banks manipulate an exogenous money supply is patently unrealistic. Meanwhile, the 'new horizontalists' retain the pre-Keynesian notions that there exists a dichotomy between the real and nominal sectors of the economy, and that money is neutral (at least in the long run) – propositions that are antithetical to Moore's analysis. Rogers concludes, however, that whilst the emergence of the 'new horizontalists' by no means represents the conversion of the mainstream – nor even does justice – to Moore's monetary macroeconomics, it may have created a moment in the development of macroeconomics that is particularly suited to highlighting the claims of Post Keynesian macroeconomics, including the interdependence of the monetary and real sectors and the long run non-neutrality of money.

The chapter by Charles Goodhart starts with a conundrum. Observation of the actual pattern of interest rate changes by the Bank of England's Monetary Policy Committee (MPC) is strongly suggestive of a policy of gradualism, as a result of which the interest rate is adjusted slowly over an interval of time in order to return inflation to its target level. But neither Goodhart's recollections of the decision making of the MPC (of which he was a member from 1997 to 2000) nor econometric evidence relating changes in interest rates to the forecasted discrepancy between actual and target inflation support the view that the Bank of England is consciously committed to gradualism. Goodhart's purpose is to explore and provide an explanation for this conundrum.

He begins by reviewing the arguments in favour of gradualism, concluding that there are reasons why central bankers might prudently adopt such

a policy. But this does not resolve the conundrum identified above: why do UK interest rates appear to reflect gradualism despite the fact that this is not the expressed policy of the MPC? One reason is related to the Bank of England's forecasting methods which in and of themselves, Goodhart shows, are likely to result in some autocorrelation in interest rate changes. Evidence provides some support for this explanation, but also suggests that it acts as only a sporadic influence on the course of UK interest rates.

A second explanation is that the Bank's forecasts are characterized by systematically autocorrelated errors, so that whilst policy at any point in time is intended to react fully to forecasted deviations of inflation from its target rate (or of output from its 'natural' level), subsequent, autocorrelated adjustments in interest rates are frequently (indeed, usually) necessary in response to autocorrelated errors in the Bank's forecasts themselves. Goodhart shows that there is strong empirical support for the view that inflation and (in particular) output forecasts are subject to autocorrelated errors, and that observed interest rate changes are a response to these errors. Hence, according to Goodhart, interest rate policy in the UK is *de facto* gradualist, largely as a result of the MPC's responses to the Bank of England's own forecast errors.

UNEMPLOYMENT, INFLATION AND THE DETERMINATION OF AGGREGATE INCOME

Part V contains four chapters that focus on macroeconomic theory and policy. In the first of these, Arne Heise develops a formal model of a credit-based economy designed to reflect several important features of Post Keynesian macro theory (including fundamental uncertainty, the central role of money, and the implications of these first two features for the interaction of financial markets, the goods market and the labor market). By using this model to analyze the interactions between the central bank and the private sector, Heise examines the possibility of pursuing 'hydraulic' demand-management policies based on the manipulation of interest rates by the central bank. An important result that emerges from this exercise is that the effects of monetary policy on the economy are asymmetric, thanks to an asymmetry in the model's price dynamics and hence in the response of inflation expectations to monetary policy. In short, restrictive monetary policy always succeeds in depressing real economic activity in a conventional fashion, but expansionary monetary policy may or may not succeed in reflating the real economy. The resulting uncertainty over the effects of expansionary monetary policy precludes the possibility of 'hydraulic' demand-management in which the central bank acts to 'fine tune' the

economy, although, as Heise points out, this does not mean that there is no role for monetary policy. On the contrary, the creation of institutions that reduce uncertainty and instability coupled with ‘coarse tuning’ remain legitimate policy goals, he argues.

Giuseppe Fontana’s chapter is concerned with the teaching of macroeconomics and, in particular, the successful incorporation of the Post Keynesian theory of endogenous money into a teachable macroeconomic model. Whilst acknowledging that the exogenous money hypothesis has been abandoned in other work aimed at undergraduates (for example, Romer, 2000), Fontana’s ambition is to transcend what he identifies as the crude empiricism of the ‘new consensus’ and develop a teachable macro model embodying endogenous money that provides students with a more sound theoretical appreciation of the roles and interaction of the banking and non-financial sectors in the income-generating process.

Fontana focuses on the traditional aggregate demand schedule drawn in price/quantity space. He shows how a familiar downward-sloping aggregate demand schedule can be rationalized by postulating: (a) that at least some components of aggregate expenditures are interest sensitive; (b) that commercial banks act as ‘producers of credit’ to finance private expenditures, pricing their output at a mark-up over the ‘wholesale’ interest rate at which they borrow from the central bank; and (c) that the central bank follows a monetary policy rule according to which it adjusts the wholesale interest rate in response to the price level. Combination of these postulates results in the familiar inverse relationship between price and aggregate output that characterizes the conventional aggregate demand schedule.

Fontana goes on to show that this model can also be used to discuss Post Keynesian hypotheses such as the instability of aggregate demand in response to expectations formed under uncertainty. He concludes by arguing that the chief virtue of his model, aside from its ‘teachability’, is that it eschews the exogenous money hypothesis and incorporates from the start a view of the money supply as being endogenous. In this way, and without abandoning simple and potentially useful pedagogical tools such as the downward-sloping aggregate demand curve, the model provides a vehicle for establishing endogenous money as a fundamental principle of macroeconomics in even the earliest of undergraduate course work.

Chris Niggle identifies three competing approaches in contemporary macroeconomics: New Classical Economics (NCE), based on the notion of an inherently self-regulating economy characterized by steady growth and requiring minimal government intervention; Institutionalist-Post-Keynesian Economics (IPKE), in which the economy is characterized by chronic unemployment and instability problems and an uneven growth process requiring systematic government intervention; and a New

Keynesian, 'New Consensus' Macroeconomics (NCM), in which occasional episodes of instability require periodic government intervention and government policy can affect the endogenous growth rate. Niggle argues that both IPKE and NCM can be understood as reactions against NCE, but that these two approaches are otherwise fundamentally different, with IPKE constituting the more radical departure from the strictures of NCE.

Niggle shows that NCM retains certain critical features of NCE (such as its emphasis on individualistic microfoundations and the concept of a supply-determined, natural rate of unemployment), but rejects others. Hence the price mechanism is conceived as sclerotic, so that aggregate demand shocks regularly affect quantities (of output and employment) and policy intervention is required to accelerate the otherwise sluggish adjustment of the economy to these shocks. Moreover, monetary policy is understood to be conducted via the manipulation of interest rates with the quantity of money in circulation determined as an endogenous residual (although as in the NCE, monetary policy is privileged over fiscal policy and the sole focus of macro policy is the abatement of inflation – an inevitable consequence of NCM's adherence to natural rate doctrine). Finally, NCM conceives a role for state intervention in the growth process, via manipulation of the supply-side determinants (such as education or R&D activity) of the endogenous growth rate.

In contrast, Niggle characterizes IPKE as a radical critique of NCE. It involves a wholly different conception of the economy, in which decision makers face fundamental uncertainty (rather than just probabilistic risk), giving rise to a different theory of money. Aggregate output and employment are demand-determined: supply does not automatically create its own demand, so there is no natural rate of unemployment. In this environment, the price mechanism is potentially destabilizing, not simply sclerotic. Such barriers as do exist to downward wage and price flexibility may be beneficial, rather than impediments to macroeconomic adjustment. Finally, although IPKE shares with NCM an emphasis on interest rates as the key instrument of monetary policy, this results from a theory of endogenous money in which credit-creation is an essential feature of a monetary-production economy. Moreover, monetary policy is not privileged over fiscal policy: via their impact on aggregate demand, both are understood to impact macro performance in both the short and long run, the latter being characterized by a growth process that is demand-led.

In the final chapter, John and Wendy Cornwall contemplate a future for Keynesian macroeconomics, demonstrating how short-run Keynesian macro principles can be extended and embellished to permit analyses of the medium and long runs.

Cornwall and Cornwall distance their own brand of Keynesianism from New Keynesian Economics. Foremost amongst the authors' criticisms of the latter is their observation that, with its emphasis on self-correcting, short-run disturbances around a supply-determined steady state expansion path, New Keynesianism provides no explanation for the lengthy, medium-run 'episodes' of better or worse macroeconomic performance that have characterized actual capitalist economies during the twentieth century. The Cornwalls then set about developing a medium- and long-run Keynesian analysis that *is* consistent with the stylized facts of the past century. Working in the context of a demand-constrained macro model (which does not automatically revert to a supply-determined equilibrium), they contend that the demand for expansionary macro policies (based on the distribution of political power) coupled with the willingness to supply expansionary policies (based on the inflation costs of any given rate of unemployment) are the ultimate determinants of aggregate demand and hence macro outcomes within any given episode of capitalist macro performance. These outcomes are then allowed to have feedback effects on the structural determinants of the demand for and supply of expansionary policies, setting up a model in which the recursive interaction of the demand for and supply of expansionary policies on one hand, and macroeconomic outcomes on the other, creates a long run that is an evolutionary sequence of medium-run episodes of macro performance.

Finally, Cornwall and Cornwall demonstrate the explanatory value of their model by explaining macro outcomes during both the Golden Age (1948–73) and the subsequent Age of Decline (post 1973) in terms of the distribution of political power and the inflation costs of any given rate of unemployment. The particular configuration of the structural determinants of the demand for and supply of expansionary policies during the Age of Decline – and hence macro outcomes during this episode – is shown to have been induced by macro outcomes during the Golden Age. The authors conclude, in a fitting finale to the volume that Basil Moore himself would no doubt appreciate, that the future of Keynesian macroeconomics – indeed, the future of macroeconomics *writ large* – must involve rejection of all vestiges of supply-determined equilibrium analysis and a willingness to better explain the key stylized facts of capitalist macroeconomic performance.

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