Money and Production: A Pluralist Analysis

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Abstract

The purpose of this thesis is to argue that the core of a monetary economy is a network of triangular contracts between banks, firms, workers and capital goods suppliers. Not only does this network give rise to the creation and valuation of money but it is the organising feature of modern economies, giving rise to both episodes of stability and crises. In constructing this argument I consider both orthodox and heterodox points of view.

We analyse equilibrium models of money, and find that while money can exist in sequence economies with frictions, models of this type give no justification for its creation, valuation or holding for any significant duration, either theoretically or experimentally. Models that introduce dated goods and trading frictions to motivate the issue of risk-spreading 'bundled' debt are more promising for money creation, although they still cannot explain the the holding and valuation of money

Using the concept of team-production of Alchian and Demsetz and that of 'hostage-taking' in contracts owing to Williamson, we demonstrate how the issue of a token of generalised purchasing power from a team-production contract can enhance output and consumption. This conclusion motivates an original monetary theory of production that integrates the insights of Post-Keynesian monetary theory and the triangular contracts of the Circulation Approach and expresses them in a way that shows consistent asset and liability matching through a balance sheet approach. The creation and valuation of money and the determination of interest are embedded within the central processes of this economy.

The features of the monetary production economy we analyse are in contrast to the mainstream proposition that the economy as a whole is rendered coherent by the existence of a unique and stable equilibrium determined by the utility-maximisation of households and the profit maximisation of firms. Apart from their inability to describe the economy in aggregate, such models treat money as an afterthought that is in no way core to their conception.

We set the triangular contracts within a rigorous stock-flow framework of the type developed by Godley and Lavoie and argue that the shifting of the level of impact of uncertainty and failed expectations induced by money leads to specific patterns of economic disruption. These patterns are independent of the specific behavioural characteristics of households and firms and so are robust to policy changes that leave the institutions of the monetary production economy intact. We briefly assess current monetary policy and alternatives in the light of these findings.

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Chapter 1. Concepts

1.1 Introduction

1.1.1 Understanding Money

Without understanding money, we cannot understand the workings of the modern economy, or hope to manage it to the benefit of society. This is contrary to much current economic theory, which either regards money as a commodity to be slotted into a Walrasian general equilibrium model, or which simply ignores its existence altogether as in modern 'New Keynesian' models exemplified by the work of Michael Woodford (2003). Such models relate the price level, economic activity and interest rates without the interposition of monetary quantities at all.

Failure to understand the nature of the money on the part of economists and policymakers has allowed changes in the way the sector of the economy has developed to service its needs for finance that have been characterised as 'financialisation' (Palley 2007, Stockhammer 2007). As this thesis is being completed, it has become increasingly clear that this process has been unsustainable and probably deeply harmful to the real economy of the production of welfare-enhancing real goods and services.

1.1.2 The Features of Modern Money

The most characteristic feature of the modern capitalist economy is its use of tokens of no intrinsic value to serve as means of exchange, means of payment and as a store of wealth. These tokens may take the form of paper notes or coins, but much more frequently today are simply patterns of electronic data. These tokens, or means of

rapidly transferring them or creating them in the form of debit and credit card technologies, are used in almost all transactions in the modern economy.

In this thesis we identify the powers by which banks are able to issue these tokens of future consumable services and production; we identify why they become accepted by individual agents in the economy; how they subsequently circulate among agents, and how they acquire a specific value. These powers originate from a 'team-production' contract that aims to harness labour, capital and entrepreneurial resources for the purpose of increasing the quantity and choice of consumption for the contractors. The purpose of the token issue is to facilitate the benefits of the contract, when time and uncertainty are factors. We must also account for the proliferation of different institutions today all of whose issued tokens are equally acceptable and of equal value and explain the role of money issued by the state, that takes the forms of bank reserves and cash, in this story.

It will be apparent that the association of money with banks narrows the definition of money somewhat. We are focussing on bank credit-money because we believe that it has unique properties. We do not believe that these unique properties are shared by other financial assets. The unique property of bank money is that it is always generalised liability. No specific institution has ultimate responsibility for converting these liabilities into real goods and services, in contrast to all other financial assets such as private and government bonds, stocks and shares and derivatives of these assets. All of these latter assets have a monetary value that is derivative of the ability of their issuer to have bank credit-money available if and when the claim is exercised. It is true that the use of such assets as media of exchange, say between firms, can save the use of money in the short-term, but these transactions involve specific relationships between firms and their inputs and outputs. This has the effect of rendering these transactions

more akin to barter than monetary transactions. To the extent that such transactions will finally involve monetary settlement they represent shifting of monetary liability and reward. This means that it is possible to issue a bond and money on the same output. This should indicate that specific financial liabilities are not substitutes for the general financial liability of money (see Sproul 1998). The unique and fascinating feature of modern bank-credit money is that its acceptance and value depends on the monetised economic system *as a whole*, both the private and state sectors.[1]

1.1.3 Monetary Production and the Triangular Contract

This thesis delineates a Monetary Theory of Production that adopts the insights of Post-Keynesian monetary theory and those of the Circulation Approach and expresses it in a way that shows asset and liability matching through a balance-sheet approach. In doing so I analyse how the creation and valuation of money have their origin in 'team-production' contracts between firms, workers and/or capital goods suppliers. These contracts become 'triangular' with the involvement of credit-money issuing parties.

An original proposition of this thesis is that the pattern of these triangular contracts and the accounting links between them is the organising principle in modern monetary economies. This is in contrast to the proposition of most modern theory that the economy is rendered coherent by the presence of a unique and stable equilibrium determined by the utility maximisation of households and the profit maximisation of firms. While the monetary institutions provide an underlying structure to economic activity the behaviour of firms and households within this structure remains almost impossible to aggregate because of the degree of interdependency of their activities

[1] The scope of the 'monetised economic system' discussed in this thesis is national, but we believe the same reasoning applies to single currency areas, and to the extent that different currencies are linked, to the global economic system.

(Colander 1996). This is compounded by the fact that the introduction of money, while it 'lulls the disquietude' of risk-averse individuals, cannot *remove* the effects of uncertainty, only *transfer* its effects to more systemic levels. We are left with a framework around which almost chaotic behaviour is likely to eddy, as a result of the constantly changing behaviour and interactions of individuals with each other at the microeconomic level and with events at the macroeconomic level. While it may be that new computational techniques will render tractable models of these interactions in the future, at present we can still draw some important conclusions from the basic framework

We do this by setting the triangular contract within a rigorous stock-flow consistent framework of the type developed by Godley and Lavoie and others. In particular we demonstrate how inflation and persistent fluctuations in economic activity can arise from the systemic effects of the uncertainty that the team–production contract has propagated through the economic system. Given these explanations we analyse some possible remedies to deal with the effects of this generalised system uncertainty within the monetary framework revealed.

Before we outline the structure of the thesis we will spend some time clarifying some of the key concepts involved in this work.

1.2 Pluralism

Apart from 'Money' and 'Production' the other critical word in this thesis title is 'Pluralist'. This term is itself the subject of some debate, so we will take some time to discuss in what way our approach is pluralist. Pluralism has itself been subdivided into Structured Pluralism (Dow 2005), Critical Pluralism (Freeman and Kliman 2006) and Strategic Pluralism (Davis 2007).

Structured Pluralism is based on the idea that 'schools of thought…represent the segmentation of open systems in a provisional, partial and incompletely specified way' (Dow 2005, p2). These schools of thought are thought of as reflecting fundamental methodological differences. In particular

> orthodox economics is unified by the positive heuristic to derive conclusions from the assumption that (atomistic) individuals optimise subject to constraints according to a particular notion of rationality, and to analyse in terms of equilibrium, in such a way as to be amenable to mathematical expression and even if only in principle empirical testing (Dow 2005, p5).

Heterodox economics, in its many guises, tends to oppose this approach in holding that since the real world is an open system[2] with internal and external influences that cannot be encompassed within such a model. Thus an approach utilizing multiple arguments like the multiple strands of a rope may help us to build up knowledge of the social (and economic) system. Dow echoes Kuhn in pointing out that

> just like orthodox economics, heterodox economics cannot claim superiority in any ultimate (non-paradigmatic) sense. We can produce arguments for its superiority, but it is not demonstrable in any absolute sense (Dow 2005, p7).

The multiple methodologies of economics must be based on multiple modes of closure of their different models of the economy, all with different connections and lack of connections between different elements of the economy. Each closure is however provisional and should be accepted as such by practitioners of each methodology with willingness to change the 'configuration of connectedness' (Dow 2005, p10).

'Critical Pluralism' as advocated by Freeman and Kliman is predicated on the idea that truth or progress towards it arises only if empirical reality is tested against a multiplicity of theoretical explanations of that reality. They reject the 'working out of a

[2] Here the term 'open system' is used in the sense of a system where there are always elements internal and external to the system that cannot be accounted for and/or predicted (Lawson 1997).

single explanation within a single paradigm, attempting to demonstrate its superiority against both existing orthodoxy and alternative heterodoxies' (Freeman and Kliman 2006, p31). They argue that this 'competition of schools' will select, not for truth, but for political acceptance by the classes in society who fund it. The prescription is thus 'cross-paradigmatic engagement as the prime commitment of theoretical activity' (Freeman and Kliman 2006, p46).

In response to Freeman and Kliman, Davis (2007) accepts that a pluralism of diversity and schools tends to result in failure to engage with alternative views, but suggests that critical engagement cannot be imposed on economics. He advocates a 'strategic pluralism' in which shared principles across schools are demonstrated.

This thesis has much sympathy with the idea of Critical Pluralism; that actual engagement between different approaches is necessary to obtain a picture of the economy that allows for effective analysis and intervention. Dow is surely right that multiple approaches can be better than one, but this raises questions about the number of approaches that should be considered, and how to weight different approaches when they lead to conflicting conclusions.

Freeman and Kliman give the only possible answer when they say that 'empirical reality' is the criterion to judge economic theories, but this is by no means unproblematic. What empirical reality do we choose? How do we recognise it? And how do we know that reality today will match reality tomorrow?

There is no value in an analysis of a problem that does not have the power to persuade, and where economics is concerned there is a serious methodological separation that has to be bridged. Here Strategic Pluralism has a part to play – but in

monetary economics the gulf seems so great it is difficult to know where to find common ground.

Our approach tackles these issues by paring the problem down to fundamentals. These include the motivations that might have given rise to the creation of money; exchange for the neoclassical orthodoxy; production for the heterodox. We make no apology for insisting on this. Just taking a 'dip into history' and accepting given conditions at the start of an arbitrary period may save some time and effort, but it may well not give us all the information we need to understand how our monetary economy works. An explanation of a system that cannot account for how it started is an unsatisfactory one. We can also show that the link between money and production can in itself tell us most of what we need to know while side-stepping many of the arguments about specific behavioural functions and how these translate into aggregate macroeconomic tendencies.

In doing this we attempt as far as possible to consider all concepts of money on their merits. Any omission or selectivity in assessing any particular one should be taken, not as evidence of explicit methodological bias, but of time constraints or of a failure to read more widely.[3] We come to what is very much a heterodox conclusion however, and so we are at risk of a problem Sheila Dow recognizes for her own school of thought.

> Post-Keynesians should beware of conducting critiques of the orthodoxy in the orthodoxy's own terms; there is a danger that the orthodoxy will persist in assuming that language and concepts are being used in the same way by all concerned (Dow 1993, p10).

Since I am guilty in some ways of ignoring this good advice, as far as possible I wish to ameliorate the problem by discussing some further concepts critical to the

[3] Implicit bias cannot by its nature be avoided. The reader must assess whether, in his or her view, it invalidates what we have to say.

chapters that follow and try to make clear the sense in which they are being used in this work. These concepts are those of Equilibrium, Production and Welfare, and Uncertainty. I take the risk that Dow warns of, not because of innate recklessness, but because I believe that the mistaken assumptions of the orthodox analysis of the monetary economy are so far wrong and so damaging that they must be tackled head on, and some sort of commensurability established with an alternative view.

1.3 Concepts of Uncertainty

Critical to discussion of money is the concept of uncertainty. Given the pluralist nature of our investigation this requires us to tread a path through different concepts of uncertainty and how this might influence expectations of the outcome of a production contract. The Keynesian concept of uncertainty admits two elements; firstly a probability element (which may not be expressible numerically), and secondly a confidence element, corresponding to the weight of argument or evidence supporting that probability (Mizuhara 2002). This contrasts with the concept of subjective probability, derived from Ramsey (1931), that expresses strength of belief as betting odds over monetary values. This leads to the conception of 'Expected Utility' that is used in many orthodox economic models, where a menu of possible outcomes can each be given a numerical combination of probability and benefit.

Considering the uncertainty associated with a contract, the risk of reneging on it might be calculated from various bits of evidence:

1. Personalities of the contractors
2. The difficulty of retrieving one's own share of output after production is completed
3. Past experience of such contracts

4. Cost-benefit of other party to reneging on the contract, particularly if further contracting is envisaged

Each party to the contract will have the following choices:

1. Deciding to go ahead with the project
2. Deciding not to go ahead with the project
3. Waiting for more information.

If probabilities are non-numerical, as suggested by the Keynesian concept of probability, how is a potential contractor to decide between these options? There must be some way of ordering the possibilities if we are to choose in any form of rational way.

> Objects can be arranged in an order, which we can reasonably call one of degree or magnitude, without its being possible to conceive of a system of measurement of the differences between the individuals (McCann 2003, p44).

Even if we assume that no evidence is available or the benefits of acting immediately outweigh the benefits of further information, if participants are risk-neutral and unbiased as to loss or gain it seems that the principle of indifference must apply in the sense that any decision is equally rational (Ramsey 1931). But it is also true to say that any decision is equally rational if all the available evidence points to a track record on the part of the contracting partner of exactly one half for completing or reneging on the contract. So in this sense it seems justified to say that what we are expressing is the overall belief that the evidence, and confidence in that evidence for contract reneging is or is not outweighed by the evidence and mechanism in place to force or incentivise completion of the contract. The common ground between the two concepts of probability in this case seems to be ‘that the degree of a belief is a causal property of it,

which we can express vaguely as the extent to which we are prepared to act on it' (Ramsey 1931, p14).[4]

For Keynes there is a propensity to act, that comes about from the rational calculation of probability, the state of confidence in the evidence giving rise to this calculation and even the personal characteristics of the decision maker (Mizuhara 2002, McCann 2003). If we include all of these in our uncertainty measurement then we could simply say that we are comparing the propensity to act with a particular assurance mechanism to that without it.

Importantly, Keynesian uncertainty includes the possibility of fundamental uncertainty where 'we just do not know'. Here it seems there can be no calculation of the best course of action, so that either no action is taken or if it is taken some degree of reversibility is required. The existence of some degree of this sort of uncertainty makes the long-term holding of general purchasing power attractive (the existence of positive 'liquidity preference'), and so may well be relevant to why money is created and held (Glickman 2003, Runde and Mizuhara 2003). Uncertainty of this nature is also likely to be source of expectations and valuation based on 'convention' (Keynes 1964[1936], Dow 2003). We will discuss the issue of uncertainty further as it becomes relevant in later chapters.

1.4 Production

This thesis is about a 'Monetary Theory of Production', or what might equally be termed a 'Production Theory of Money' since in the modern economy they are really two sides of the same coin (albeit two sides that may not match). But while we

[4] Keynes rejected the Principle of Indifference in his *Treatise on Probability* (Keynes (1973[1921]), on the grounds that it leads to contradictions when multiple choices are considered. We believe that when such choices are considered sequentially, this objection can be met. But this issue is not pursued further here.

are spending a lot of time discussing the nature of money it is important also to understand what we mean by production.

Production is the process of bringing something into existence that did not exist before in exactly that form, usually by the application of human effort and ingenuity in combination with some pre-existing non-human object or objects (which may be natural resources or the outcome of some preceding production process).

The output of production is ultimately demanded for the purpose of enhancing the life of an individual or organisation. Indeed it must do this to the extent that it subjectively justifies the giving up of something that the purchaser values. In a single firm model of the economy in which production is taking place, the 'purchaser' gives up their labour and/or their own resources to the production process and consumes the output of this process themselves. There is thus a very obvious subjective link between the value of labour or resources supplied and the output received. But in a monetary economy what is given up to receive output is purchasing power acquired from labour effort or resource supply elsewhere in time and/or space. The quantity of labour and resources that has gone into the production of *this* output, relative to own labour or resources expended cannot be known with certainty.

We are interested in analysing the value of money in a more fundamental way than is expressed by a price level calculated from a weighted basket of commodities, in part because this assumes the nature of the monetary economy that we are seeking to explain. Keynes makes the point that

> Human effort and human consumption are the ultimate matters from which alone economic transactions are capable of deriving any significance; and all other forms of expenditure only acquire importance from their having some relationship, sooner or later, to the effort of producers or to the expenditure of consumers (Keynes (1971[1930], pp120-121),

and it is the individual balance between effort and consumption, both in quantity and quality that determines the behaviour of economic agents, as far as we can analyse it. Even then, how do we interpret changed attitudes to the output of the contract after a period of time has elapsed? Unfortunately in a multi-firm environment, where the reward for effort and the cost of consumption are translated into the form of generalised purchasing power we have to determine, not the relationship of physical effort to physical reward but of physical effort to monetary reward for households and individuals (and of monetary expenditure to physical reward in terms of existence and growth for firms). This adds another dimension to the problem. Non-monetary methods of determining the welfare value of output might, at the subjective level, include some form of democratic/consultative process or, at the objective level the use of some form of happiness measure.[5]

Ultimately in our investigations we are less interested in measuring the benefit of production exactly, than in pointing out that satisfaction with the team-production contract as initially determined can change so as to mean that effective demand is out of step with the expected demand of the contract. It is the uncertainty about this that leads to the failed expectations we shall analyse in chapter 6.

It is important to point out that the contribution of economic processes (exchange and production) to welfare is not to be measured in the total value of their outcome. The true measure of welfare is in the difference between the value of the inputs and the value of the outputs. Labour and resources that are not used in monetised economic processes still exist and are still available to their owners to provide potential welfare. For this reason we must be wary of equating the scope of the monetary economy (as measured by GDP, for example) with the contribution of economic

[5]See Oswald (1997), for example.

processes to human welfare. Given a social, rather than monetary definition of welfare, it is perfectly possible for expectations of the welfare-enhancing role of any production process to be simply wrong, and for the expenditure of effort and resources in an economic process, where reward is implicit rather than explicit to be detrimental to welfare rather than beneficial.

We should note then that 'production' can include not only services that make the creation of goods and services more efficient, but also services that make their consumption more welfare enhancing. What is produced (output) need not be tangible; it includes all goods or services that may be demanded, including goods or services that enhance the production process. Where the buying and selling of assets serves to bring them into the hands of those who can maximise their efficient use in production of real goods this 'speculative' behaviour could be regarded as a form of production. Another important service in modern economies is one that can shift consumption in time to where it produces the greatest subjective welfare benefit. This is the role of household lending.

1.5 Money and Equilibrium

In this thesis we have been willing to consider models that rely on finding some form of equilibrium, where

> no decision-maker to the extent that his or her action has been appropriately captured in the model, has even the slightest motivation to change any plan or action. (Katzner 2006, p126).

This is on the basis that any proposed equilibrium condition is as likely to occur as the premises on which it is based are true, including the mechanism by which equilibrium is presumed to occur. Moreover, in the sense that any enduring observation or

institution must represent a balance of the forces that tend towards its disappearance, equilibrium *is* a feature of the real world. The questions that have to be asked are:

1. What are the forces accounting for enduring features of the economy?
2. How long are these forces likely to persist for?
3. What happens when one or other of these forces change (which may or may not include some new 'equilibrium')?

In contrast to orthodox, neoclassical economic model-building we recognise that the subsets of forces that taken together make up any apparent economic equilibrium are inevitably few in relation to the subsets of forces that are relevant to the economy as a whole, so that such an equilibrium is always the exceptional result of social and economic forces rather than the rule. This is particularly the case because predicting equilibria requiring a balance of human behaviours imply that

> all events (past, present and future) that may have a bearing on the equilibrium are assumed to be completely knowable at least probabilistically (Katzner 2006, p127).

The default assumptions made in orthodox models of equilibrium in the goods, labour and money markets clearly fall into this category, and are hardly realistic in a world of continuous and pervasive change' (Katzner 2006). A parallel distinction is between the logical time of equilibrium modelling and the historical time of alternative models, such as those of Post-Keynesian economists. Time is 'historical' in the sense that each moment in history is taken as unique, with fragmentary and variable knowledge of past events and unknowable (even probabilistically) future events. As a consequence behavioural variables cannot remain constant as planned behaviour continually changes. Thus a solution to such an economy is time-dependent and it cannot be assumed to be the solution in the next period, as parameters and structural

relations are expected to alter. This implies that such analysis does not allow formal prediction (Henry 2006).

Although we will argue that a monetary economy cannot be in general equilibrium, nevertheless certain partial equilibrium concepts may be relevant to answering these questions and understanding the role of money in the economy. The continued issuing, existence and acceptance of money all imply equilibria, in that the forces existing that may tend to end these must be opposed by at least equal forces. And we know of several forces, on theoretical and empirical grounds, that can or at any rate come close to destroying the institution of money. These include, but are not limited to, loss of credibility in banks to maintain the convertibility of money, rapid changes in the value of money and shortages of money. So we must look for a balance of forces for and against the issuing or creation of money; that is to say someone must be made (ostensibly at any rate) better off by creating it and someone must be better off by accepting it. Moreover, there must be no overwhelming force suppressing its existence, which in a modern democracy is to say that there must be at least an apparent social benefit (or at least absence of disbenefit) to the existence of the institution of money.

We will argue that the monetary institutions of a modern capitalist economy are the product of one of the enduring subsets of forces that give rise to conditions that can, at least in some senses, be regarded as an 'equilibrium'. This is what makes the monetary system and its relationships to the real economy of consumption and production a potentially more fruitful framework from which to study economic forces and outcomes than others.

1.6 The Use of Mathematics

> [T]o state a theory in terms of a formal model is…a matter of costs and benefits. The benefits are greater rigour,

> more precision, demonstrable results. The costs are associated with the way in which formalising an argument can change its meaning (Chick and Dow 2001, p705).

The problems associated with formalizing an argument in mathematical terms relate to the choice of axioms, the choice of method, the type of logic employed or how the mathematical model is 'closed', as well as how it connects (and does not connect) to the real world. To observe or theorise about regularities in real world events requires agents that can be isolated from forces outside the model and agents inside the system whose responses can be anticipated with reasonable consistency. Because economic agents are constantly acquiring new information and responding to existing information in new ways, and because the economic institutions and conventions with which they interact are constantly evolving, the extent to which such models are likely to be helpful is clearly limited. Perhaps the most important axiom that we use in our mathematical formulations in this thesis is that individuals, firms and governments will not knowingly act against their own interests. This need not assume perfect information or rational expectations.

Our specific use of mathematical arguments in this thesis will be confined to the following:

1. To indicate the relationships between monetary values where strict accounting is a part of the institutional reality we are analysing.
2. To indicate, where ordinal comparisons may be possible, the implications of their different potential outcomes.
3. To illustrate the logic employed in alternative models we analyse.

1.7 Outline of the argument of the thesis

In the first four chapters of this thesis we examine concepts of money and its origin and valuation, and attempt to extract what is useful, coherent and consistent from these to construct an understanding of money that not only makes sense of what we observe in the modern economy, but of its nature provides a framework for understanding its successes and its failures and how to promote the former and avoid the latter.

The fundamental questions we must answer are

1. What is money?
2. Where does it come from?
3. How does it get or lose its value? (Ingham 2004)

Until we can answer these we cannot argue that money is important, or explain what its importance is.

We start in Chapter 2 by dealing with the approach to money taken within the orthodox realms of analysis of supply, demand and equilibrium. We show that there is little support for the theory that money arose from the desire for more efficient exchange, either from theoretical or experimental work. Models of money that use dated goods and frictions that arise in the context of these to motivate the issue of debt tokens, and how these might circulate, are rather more promising, although still some way from supplying what we regard as the interesting features of money. To try and get an idea for the essence of money as circulating debt, we construct a 'team-production/hostage' model and consider its implications.

Following on from our findings in the previous chapter, Chapter 3 considers the Monetary Theory of Production in two of its guises. Post-Keynesian monetary theory

and the Circulation Approach both emphasise the idea that money developed not as an aid to exchange, but as an essential for the production process. We compare and contrast these approaches and construct a coherent synthesis within a double-entry book-keeping framework that strictly matches financial assets and liabilities. Within this framework we analyse the issues of the role of the central bank, liquidity preference and the monetary flows of interest payments and profits. We emphasise the importance of 'triangular relationships' that create money at the same time as creating the conditions for its acceptance (Graziani 1989, 2003).

Chapter 4 considers how money gets determinate value in terms of physical goods and services. What if anything likes behind the token? What is the backing of money, and is this backing of any real importance in the modern economy. We show that conventional valuation, legal tender status and valuation through taxation are inadequate guides to value. Using some arguments deployed in the 'Real Bills' controversy we argue that it is not just the acceptance of money that is determined in the triangular relationship explored in Chapter 3, but also its valuation as a money of account that can subsequently be expressed in transferable form. In this chapter we also argue for a real basis for the rate of interest.

Chapter 5 approaches the problems of a monetary economy from the macroeconomic perspective. How can we understand the patterns of production and consumption in the modern economy? We analyse some orthodox general equilibrium models of the monetary economy and find their treatment of money inconsistent and unhelpful. We review the evidence against the general equilibrium framework and find it in any case inadequate for providing a meaningful framework for analysis of a multi-firm, multi-agent economy. We consider some heterodox macroeconomic models and

find that while these are less rigid in their modelling they are still too ambitiously determinate and over precise.

In Chapter 6 we make the innovative claim that, on the basis of our preceding findings, the monetary economy should be analysed as a network of triangular relationships that create money, establish its acceptance and set its expected value. Much of this network is in the form of flows of monetary assets and liabilities linked by double-entry book-keeping. We argue that the linkage of these flows provides an alternative and more promising framework for analysing the modern monetary economy by establishing important parameters within which it must operate. In particular we show how this can be demonstrated using a Stock-Flow consistent (SFC) framework, but without presuming specific behavioural closure.

We also make the claim that the triangular relationships at the core of an evolved monetary economy have significantly evolved away from their original role as team-production enablers. Their ability to create generalised purchasing power has separated the physical value of inputs and outputs, so that their relative value (and thus the benefits of production) are often difficult for agents to calculate. This leads to a strong likelihood that the expected monetary valuations of output determined in the triangular contracts are not realised. Using our Stock-Flow framework we analyse the menu of possible outcomes of such failed expectations. We briefly analyse policy options based on this analysis.

Chapter 2. Equilibrium Models of Money

2.1 Introduction

The modern economic orthodoxy aims to base macroeconomic outcomes on the analysis of individual and global optimisation of welfare. This is no less true for questions about money. From the mainstream perspective, if a monetary economy is not fundamentally different from a non-monetary economy, then the modelling of monetary economies can be based on the Arrow-Debreu formalization of Walrasian general equilibrium. The maximum possible welfare, defined in terms of Pareto-efficiency, is, given initial endowments, achieved by the free exchange of goods at multilaterally-determined relative prices with no excess demand or supply. This is only prevented by deficiency of information or foresight and/or external interference in the economic sphere. Notwithstanding the relevance of the general equilibrium model itself, money presents serious problems for this type of theorising.[1]

It is certainly possible to envisage and set up a general equilibrium model in which some of the goods exchanged are contingent on time and on future states of the world, but unless all players are willing (or forced) to make decisions instantly, the process toward equilibrium may be indefinitely suspended.[2] If a contingent purchase is a once and for all decision, then a purchaser may hold paper that 'entitles' them to this output, but it must also 'force' them to accept it when it is delivered. Money in a

[1] We will discuss some more intrinsic shortcomings of Walrasian general equilibrium in Chapter 5.
[2] See Starr (1997) for an example of such a model.

monetary economy is clearly not like this; it represents an entitlement but not a contract, so there is the possibility that money may be held and not spent, and thus markets fail to clear.

In this chapter we will survey the possibilities for money arising as an equilibrium solution to models of exchange and production with various frictions. We find that while pure exchange models may explain the use of a commodity money they cannot justify its creation and holding. On the other hand, models with dated goods that are demanded by agents other than their producers may serve to give rise to the creation of a token money, where the token records a specific debt obligation. These models' 'bundling' technologies can allow this form of money to circulate. We then generalise the insights of these latter models in a model of 'team-production' where we show the potential benefit of a 'hostage' in the form of generalised purchasing power being offered from one party to the contract to the other.

2.2 Frictions in Exchange

> The comparison between a monetary economy and a frictionless barter economy serves no purpose…the only meaningful comparison is with a barter economy where transactions are costly because of the haggling involved (Visser 1989, p2)

Individual optimisation cannot explain the beneficial addition of money to a frictionless Walrasian market. Without communication or information costs all decisions can be made at the start of model time. Money, on the other hand, enables agents to demand goods without being certain of the quantities they will be able to sell and the prices at which they will sell, and to sell goods without knowing the quantities they wish to demand or the prices at which they will purchase them. But the holding of some goods purely for exchange, especially if these goods are only promises to deliver, is difficult to model in a self-contained time period. Why would agents risk holding

end-of-period balances of bank notes or book entries that are not destroyed in final exchange with goods? For money to be held only really makes sense in sequence economies, where new decisions and new transactions are made in every period. The value of money in a sequence economy results because of asymmetric information about endowments and the cost of making decisions in advance of actual events (Visser 1989).

In the next sections we will critically examine a series of approaches that attempt to establish equilibria in which money circulates as a medium of exchange in economies of sequential trades. The specific papers discussed are of course just a sample from a vast literature, but I believe their analyses are representative of the way this approach has progressed, and helps to show what is required in a theory that explains the existence and use of money.[3] We start with the 'random matching' approach, assessing its theoretical merits as well as some evidence from experiments designed to mimic these models as closely as possible. We then go on to discuss an approach that involves communication and information frictions in sequence trading that give rise to circulating debt instruments. Finally in this section we consider a model where multilateral debt is created to counter limited commitment and resaleability issues.

2.2.1 Kiyotaki and Wright and Commodity Money

Kiyotaki and Wright attempt to derive 'objects that become media of exchange [that] will be determined endogenously as part of the non-co-operative equilibrium' (Kyotaki and Wright 1989, p928). They consciously allude to the classical and early neoclassical economists' emphasis on money arising from exchange. They achieve an endogenous derivation of commodity and/or fiat money in a general equilibrium

[3] For more comprehensive consideration of equilibrium money models see Kiyotaki and Moore (2002) and Dalziel (2000).

matching model. Trade using media of exchange emerges in equilibrium. They emphasise the force behind the emergence of money as specialisation so that agents need not consume only what they produce.

Period by period, agents who produce one of a particular good but demand another, are matched randomly in pairs and must decide whether or not to trade bilaterally. Agents use individually optimal (maximising expected discounted utility from consumption net of production and storage costs) sequential strategies, based on rational expectations of others' strategies and a stochastic matching distribution. Trade always entails a one-for-one swap of inventories (so the valuation of money versus goods is fixed). Kiyotaki and Wright find steady-state equilibria in the form of sets of trading strategies satisfying maximisation and rational expectations for trade. When a commodity is accepted in trade not to be consumed or used in production but to facilitate further trade it can be regarded as a medium of exchange in the form of a commodity money. Certain parameters produce an equilibrium where agents will always exchange a lower storage-cost commodity for a higher-storage cost commodity unless the latter is their own consumption good. Others involve some agents trading one good for another which has a higher storage cost but a higher probability of being accepted for trade in subsequent periods, and so is more 'marketable'. Kiyotaki and Wright characterise this as 'an example of an object being used as a medium of exchange in spite of the fact that it is dominated in rate of return by another object' (Kiyotaki and Wright 1989, p938). This is of course a notable feature of the use of money.

It is clear however that. although there are equilibria in which the use of media of exchange in their model can be sustained, there is no explanation for the first use of money.

> A critical factor in determining if an object can serve as a medium of exchange is whether or not agents believe that it will (Kiyotaki and Wright 1989, p928).

So if they don't, it won't.

2.2.2 Kiyotaki and Wright and Fiat Money

In the 1989 paper Kiyotaki and Wright also consider the possibility of a fiat money, where a medium of exchange has no intrinsic value. They introduce a fixed quantity of a good 0 which is of no benefit in production. The exchange price of good 0 with other goods is fixed, and only one good of any type can be held at any one time. Kiyotaki and Wright show that there are equilibria where good 0 does not circulate and equilibria where it does, so long as agents believe that it will be accepted in the future. Kiyotaki and Wright admit that in their model, this ultimately depends at least partially on 'faith', and indeed they suggest that 'this is a property that a good theory of money ought to have' (Kiyotaki and Wright 1989, p943). They suggest that good 0 might be a fiat money created by the government and that this enables the purchase of real commodities with intrinsically worthless and unbacked paper. Because using fiat money reduces inefficient storage of real commodities it can improve welfare as long as there is not too great a replacement of real goods. Again they do not explain beyond 'faith' how this money might come to be accepted.

In a further paper, Kiyotaki and Wright (1993) go on to model fiat money specifically. Again the value of their 'money' is fixed since all of one agent's holding of money must be spent to purchase one real commodity. Some agents are endowed with real commodities; some with money. No trader accepts a good he cannot consume because this does not increase his chances of trading, but if the probability of obtaining his good for money is high enough he will be persuaded to accept money. In this model there are three possible equilibria; a pure monetary equilibrium, a non-monetary equilibrium and a mixed monetary equilibrium. Kiyotaki and Wright show that all

agents are strictly better off in the pure monetary equilibrium, and they also find that an increase in money in the pure-money equilibrium encourages specialisation because producers can more easily market their output. As specialisation increases barter becomes more difficult, further increasing the acceptability of money.

Before considering experimental studies that have examined the plausibility of Kiyotaki and Wright's models, we will consider their models on theoretical grounds. Firstly, while equilibria exist in the models, there is no explanation as to how they might be reached. Even Kiyotaki and Wright expect 'faith' to be required before money can be used successfully and even this faith requires faith from others to avoid it being cruelly dashed. While a social benefit may exist if everyone uses money; if it is not of benefit to the first user he/she will not use it, and so no-one will use it. Secondly, money is not given its value within the model. Kiyotaki and Wright's money has a fixed, pre-determined value of one consumption unit. This assumes a common cost of production and utility for all commodities in exchange; not a very realistic assumption.

For fiat money the issue is even more problematic. The initial receiver of this money may be persuaded that it will be accepted in exchange for goods at some later date, but if he is to accept it for some quantity of goods he holds he must have some idea of its relative value in terms of other goods. Since each transaction involving money, including the first, only involves one good, there is no way of establishing relative money values of goods.

2.2.3 Experimental Studies

Duffy and Ochs (1999, 2002) have carried out experimental studies to determine whether search-theoretic theories of money can be implemented in a real-world experiment. In their 1999 paper they attempt to determine whether the finding of Kiyotaki and Wright's 1989 commodity money model that agents will pursue

'speculative' strategies is psychologically plausible. Here a good with a higher storage cost is accepted in exchange for one with a lower storage cost on the basis that by doing so a trader will have a shorter wait before being able to trade for his/her consumption good. These 'speculative' beliefs are self-fulfilling in the sense that the more agents there are in the economy that hold such beliefs, the more true it becomes for those agents.

A 'fundamental' strategy, also self-fulfilling under certain parameters, implies that the choice of a medium of exchange is based purely on storage cost. As Duffy and Ochs (1999) point out, the question remains as to which equilibrium is likely to be achieved and how it is achieved when equilibrium beliefs cannot be present at the beginning of the exchange process. To this end, Duffy and Ochs implement the Kiyotaki and Wright model by observing real subjects' behaviour in the environment specified by it.

Duffy and Ochs' laboratory version of the model introduces a random stopping rule so that there is a constant 0.1 probability of the game ending from one round to the next. This implements a discount factor of 0.9 and is intended to mimic the effect of an infinitely lived population as specified in the Kiyotaki and Wright model. Information about the historical average distribution of goods by player type in the current game is updated at the end of each trading round and conveyed to each player so that, as envisaged in the Kiyotaki and Wright model, this was common knowledge.

In set-ups conforming to Kiyotaki and Wright's 1989 model, increasing the utility of consumption did not have the theoretically expected effect of increasing the incidence of 'speculative' strategies used by some players, but did have the counter-theoretical effect of increased offer frequencies by other players. In other cases there were a higher number of players playing speculative strategies when the

parameterisation leads to this being a possible equilibrium (although co-existing with a fundamental equilibrium), but far from the extent where 100% of players are doing so; thus no speculative equilibrium obtained.

Duffy and Ochs summarise their findings as indicating that there was dominance of fundamental strategies based on storage costs, regardless of conditions. They suggest that 'At the individual level, behaviour reflected a response to differences in past pay-offs…but did not reflect any differences in response to marketability conditions…'(Duffy and Ochs 1999, p873).

The same researchers sought to extend their investigation to fiat money on the basis that 'An object becomes a medium of exchange because people have formed a (rational) expectation that it will continue to serve as a medium of exchange and this expectation need not be supported by any property of the object other than the social convention that has emerged for its use in the past' (Duffy and Ochs 2002, p638). They add to the previously-described experiment an object that occupies storage space and is in fixed supply but has no consumption value for anyone. Duffy and Ochs find that when the token object has zero storage cost it is widely used as a medium of exchange. But it is not universally accepted and other goods are also used as media of exchange. Even if it is costly it will be accepted in trade, although with less frequency than predicted by Kiyotaki and Wright and sensitive to the supply of the valueless good, but not to the acceptability of the traded and intrinsically-valued good.

We can make sense of this by observing that under certain parameters the risk of being left holding the token at the end of the game and the cost of storing it are outweighed by the advantage of easier exchange. Given the risk of the game ending while in possession of a non-valued token, this requires a good acceptance rate from other players. The model assumes that some goods have intrinsic value to some players,

but have zero value for the other players. In the game there is no disadvantage to being left at the end of the game holding a good that can be consumed by nobody, compared to being left holding a good that can be consumed only by someone else. In the real world of course, most goods can be consumed (with varying levels of utility) by most people, and even if production of goods has ceased, exchange remains possible. In the light of this there is little in Duffy and Ochs' findings that contradicts the objections to Kiyotaki and Wright-type matching models we made earlier. The fundamental problem with these models is their lack of explanation for money to be initially accepted and valued.

2.3 Dated Goods and Frictions

2.3.1 Andolfatti and Nosal: Spatial Separation and Information Failure

We now come to consider equilibrium models where agents wish to trade with each other, but some form of restriction prevents them doing so directly. Potential gains to trade cannot be exploited without the issue of promises to deliver goods in the future, that is to say they issue debt. In one type of model this restriction is based on intrinsic features of the traders or their environment. An example of such a model is that of Andolfatto and Nosal (2003). A second type of model, explored by Kiyotaki and Moore (2000, 2003) has a similar structure, but here the restrictions to direct trade are limited commitment and problems of resaleability of promises of goods. These models are an advance in that they introduce frictions specific to dated goods, and so find a role for historical time.

In Andolfatto and Nosal's model there is spatial separation between producing agents so that there is a limited communication between them, and no direct sale of promises of output is possible. Efficiency is achieved by having a private security serve as a monetary instrument; that is promises of output by one agent circulate as a general

means of payment because it is evidence of the promise made by the initial agent. An intermediary can then mitigate incentive problems by issuing low-risk claims while serving as a delegated monitor. Whereas agents with unknown histories require some tangible object to facilitate trade, agents with known histories, banks, issue 'inside money' to agents with unknown histories. As shown by Kiyotaki and Wright's model, once this exists it can improve welfare. Demandable debt instruments are backed by the collateral obtained in the issuance of money loans (Andolfatti and Nosal 2003).

Agents gain from trading 'projects' with each other, but information about the risk of failure of a project cannot be obtained without a costly audit. They take securities, including an option to audit, in exchange for a liability of the intermediary promising output of the type the agents desire when it is produced. The role of the intermediary is, in effect, simply to pool risk where the outcome of contracts is uncertain.

2.3.2 Kiyotaki and Moore: Limited Commitment and Saleability

Kiyotaki and Moore (2002, 2003) argue that there can be no use for money when full commitment can be given to allocate all future production. So they derive the use of 'money' in an equilibrium framework from its ability to lubricate the transfer of resources when there is a limit to the ability of agents to commit to future transfers of real resources. Claiming that 'inside money can be defined very broadly as any privately-issued long-term paper that is held by a number of agents in succession', they suggest that paper issued to guarantee promised output and that is held 'not for its maturity value, but for its exchange value' is thus money (Kiyotaki and Moore 2003, p1). They introduce dated goods and thus bring irreversibility into the model, although time is discrete and there is no uncertainty. Agents start projects every 3 days,

completing them 2 days later. There are three sets of agents – each set starting on the same days.

Because agents starting new projects need to raise funds by selling claims to output, they issue paper that matures in two days time. But an agent completing a project wishes to lend only overnight until their next project starts. The equilibrium market solution of an efficient exchange of dated goods is ruled out by limited commitment, so that agents can only pledge a fraction of their current output and none of their future output. What happens is that A issues paper maturing at t+2 and sells it to B in exchange for goods; the next day B resells A's paper to C in exchange for goods, and the following day A redeems his paper by giving goods to C. Thus A's paper circulates, acting as inside money.

The circulation of A's paper comes about because agent A can make a multilateral commitment that can substitute for the limited commitment power of another agent. But they identify a problem of limited re-saleability in a way analogous to Andolfatto and Nosal's limited information, and this limits multilateral commitment, because either there is an incentive to re-sell claims against 'lemons', it takes time to verify the authenticity of paper or the initial creditor has more leverage than subsequent creditors. Kiyotaki and Moore suggest a form of 'bundling' of A's projects to counteract these problems. In different ways then, Andolfatto and Nosal and Kiyotaki and Moore model why paper promising the future output of an agents production should be issued, why it should circulate, and why its circulation can be enhanced by the spreading of the production base on which it is issued, through the aggregation of debts. These insights do go some way to suggest a rationale for the existence and nature of money. In the next section we will generalise these ideas in terms of money as a production credit.

2.4 Money and Production Credit

2.4.1 Motivation for Money's Acceptance

We have argued that in pure exchange models, while an equilibrium may exist in which money is accepted by all parties and so circulates, and this equilibrium by enhancing exchange can improve collective welfare, there remains an intractable problem as to how such an equilibrium can arise in the first place. Although all may be aware of a social benefit from the widespread use of money this will not be enough to outweigh a perceived non-negligible risk of holding money that is not going to be accepted in exchange by others. In real time, there must be a first user of any money. Before they can use it they must accept it, but before they will accept it they must be assured that it can be used; that is to say they must believe that other agents will accept it in exchange. What grounds might exist for an assumption that money will be accepted by others? These might include:

1. Knowing that others *already believe* that others will accept it.
2. Knowing that sanctions are in place for those not accepting it.
3. Knowing that others are aware of individual benefits from accepting money.

The first is the conventional reason for acceptance and is as tenuous as it appears. The experimental evidence of Duffy and Ochs, discussed in the previous section, shows the fragility of intrinsically worthless 'fiat' money The practical and stable use of such money seems improbable, and as Goldberg (2004) points out it is doubtful if such money has ever in fact existed despite persistent myths to the contrary. The second suggests a legal reason, such as legal tender or taxation laws. The possible importance of these we discuss in Chapter 4. In the rest of this chapter we are going to consider the third reason.

Money and Production

Dissatisfaction with models of money arising from exchange leads us to consider a strong intuition that the existence and value of money are inextricably bound up with production. This intuition springs from the following line of thought, the basis of which has also been suggested by Tobin (1992, p774) and Kiyotaki and Moore (2001, p3): if all production in a monetary economy were for some reason to cease, with no hope of its being restarted, once all remaining efficient exchanges are completed and all stocks used up, no further exchange would take place. Anyone left holding money by the last transaction before this point would be in possession of something completely worthless as a store of value and consequently also as a means of exchange. In fact as it is known that production is to cease, no-one would accept money. Since no-one will accept money in the last transaction, they will not be willing to accept it in the last-but-one transaction, and so it will not be acceptable in the transaction prior to this, and so on by backward induction to the point at which the cessation of production becomes anticipated. It follows that the same process is relevant when any reduction in production is anticipated, with a corresponding reduction in the value of money occurring rather than a complete cessation of its acceptance. The converse - a rise in the value of money when an increase in production is anticipated - can also be predicted. In this way the perceived value of money can be linked to future expectations of production capacity and the expected utility value of production output. Moreover, it seems unlikely that the causality between money and production is unidirectional. It is difficult to see how our advanced modern economy could have come into existence without it; certainly before the development of advanced information and communication technology.

The models of Andolfatto and Nosal and of Kiyotaki and Moore seem to hint at the link between money and production; the value of their ‘money’ arising because they

are promises to provide goods in the future. But their models are quite limited and artificial. More generally, a monetary theory of production arises from the idea that some form of token, representing recompense for labour or capital goods supplied for the purposes of production, is required to bridge the gap in time between the start of production when labour and goods must first be applied to the production process, and the end when output can be offered for sale. At the simplest level one firm can be imagined to exist, producing one consumption good from one capital good and one worker. The worker and the capital goods firm each receive tokens entitling them to a claim on the firm's output. There then arises the problem of why the token issued amounts to much more than a promise issued by the consumer goods firm that the employee and the capital goods firm will receive their share of the firm's output. The token is no more valuable than the consumer goods firm and its economic and production environment are reliable. Moreover the token issued will have limited liquidity, depending as it does on the demand for the specific good manufactured by the firm. Only those individuals who wish to purchase the firm's output, or are confident of finding an agent that does to barter with, will value it in exchange. How does the multilateral set-up, given the existing frictions and/or communication problems, get started?

2.4.2 Team Production

In this section, we start with the benefit to co-operative production. The concept of team production is described by Alchian and Demsetz (1983) as being production where the output is not a *sum* of separable outputs of each member of the team. Formally: if there are two agents i and j whose inputs are X_i and Y_j respectively, then their team production Z is characterised by a production function where

$$\partial^2 Z / \partial X_i \partial Y_j \neq 0 . \qquad (2.1)$$

Intuitively we can say that a higher quantity level of input Y_j may result in a greater impact from any increase in the quantity of input X_i. There is thus a production technique where *i* and *j* can pool their resources to produce a greater output than they could each using their own resources alone.

> Team production will be used if it yields an output enough larger than the sum of separable production of Z to cover the costs of organising and disciplining team members (Alchian and Demsetz 1983, p779).

An example would be where the owner A of capital resources *k* can pool these with the labour effort *l* of individual B in a way that produces output of greater value than the sum of their separate resources or the utility they can obtain from them. To operationalise this example we can suppose that A represents a capital-owning firm and that B represents a group of employees represented by a single union, or a separate firm supplying capital goods.

We assume utility to be monotonic in both the initial resources that A and B own (*k* and *l* respectively) and in *y*, the output from team production. Thus if $U_A(y) > U_A(k)$ then $y > k$, and if $U_B(y) > U_B(l)$ then $y > l$. We assume the simplest possible team production function:

$$y = kl . \tag{2.2}$$

Since for this function $\partial^2 Z / \partial X_i \partial Y_j = 1$, it fulfils Alchian and Demsetz's criterion. Whether or not team production now takes place will depend on the allocation of output between the parties. Assuming there is zero cost to setting up the contract, and assuming that fairness is not an issue the criteria for benefit for A, then if s_A, s_B; $s_A + s_B = 1$, are the shares of output allocated to the labour suppliers and the firm respectively, the joint criteria for contracting are

$$s_A kl > k\,. \tag{2.3}$$

and

$$s_B kl > l\,. \tag{2.4}$$

We can combine these to form an aggregate contracting condition:

$$kl > l + k\,. \tag{2.5}$$

Equation 2.5 can be simplified to indicate the input relationship required for contracting to be viable:

$$k > \frac{l}{l-1}. \tag{2.6}$$

2.4.3 Use of a 'Hostage' to Offset the Risk of Contract Failure

We assume that the form of production and the ratio of inputs is such that equation 2.5 holds. Contracting is potentially beneficial to both parties, depending on the output allocation. Firstly we consider the situation where there is no likelihood of expropriation; perhaps A and B are members of the same family. In this case the firm will utilize the potential of team production. Where the suppliers of labour are not related to the owner of the firm they may fear expropriation of their share of output (which by the nature of the production process which takes place in a factory owned by the capital owner B remains in his/her control until sold). Here we make use of a simple 'hostage-taking' model of Williamson (1983) to demonstrate how credit-money will resolve the problem.

Williamson considers a contracting situation and points out that there is a difficulty where the inputs are specific and there is a delay between their application and the receipt of output, such that one party accords a subjective probability *v* to the

risk of expropriation.[4] He seeks solutions that will achieve the efficiency result outlined above, which in our case is that team production is chosen. Williamson suggests two possible contracting mechanisms

1. Labour is supplied and suppliers are offered a share of output $\bar{w}$.
2. The firm offers $\hat{w}$ on the basis of a completed contract but offers a 'hostage' of value αh, $0 \leq \alpha \leq 1$, to the employee/supplier *before* production commences. The firm loses wealth valued at *h* if it reneges on the contract.

In the first mechanism, for the supplier of labour or capital goods to benefit requires

$$\bar{w}(1-v) > l \tag{2.7}$$

$$\Rightarrow \bar{w} > \frac{l}{(1-v)} \tag{2.8}$$

In the family situation, $v = 0$, so this reverts to

$$s_l kl = \bar{w} > l\,. \tag{2.9}$$

and the contract goes ahead as long as equations 2.4 and 2.6 also hold. If there is a positive risk of appropriation then a higher $\bar{w}$ is required to compensate the labour supplier for the uncertainty of the outcome of the contract

For the firm, the criteria for contracting now becomes

[4] In the light of our discussion of uncertainty in Chapter 1 we should consider *v* as the propensity to act where this is translated subjectively into a level of anticipated utility. We can show that in the presence of an uncertainty calculation a certain course of action would be 'rational'; in the sense of following the results of a calculation translated into an ordinal value. What we cannot show is that this *will* happen, only that given a particular mode of calculating it is a plausible course of action. It seems not unreasonable that in the negotiation of a production contract, this mode of calculating might be predominant.

$$s_k kl = kl - \frac{l}{1-v} > k \tag{2.10}$$

which only holds if

$$k > \frac{l}{(l-1)(1-v)} \tag{2.11}$$

For a positive risk of expropriation *v*, this is a more stringent condition than that of equation 2.6 with the result that a contract that was previously of benefit may no longer be so, the firm does not go ahead with team production, and so both parties lose the potential benefits.

For the employee/supplier to enter the contract under the second mechanism requires

$$\hat{w}(1-v) - v\alpha h > l \tag{2.12}$$

which simplifies to

$$\hat{w} > \frac{l - v\alpha h}{(1-v)} \tag{2.13}$$

In Williamson's model he envisages $h = l$ and $\alpha = 1$, so that

$$s_l kl = \hat{w} > \frac{l - vl}{(1-v)} \tag{2.14}$$

and this simplifies to

$$s_l kl = \hat{w} > l\,, \tag{2.15}$$

which is equivalent to the conditions 2.3 and 2.9. This means that the firm and the supplier will get benefit from any use of potential team production and so it will go ahead. From equation (2.13) we can see that any reduction in the value *h* of the 'hostage', or its value to the suppliers αh will increase the wage the firm must pay, reducing the chance that team production goes ahead.

Williamson makes reference to the fact that the efficient conditions $h = l$ and $\alpha = 1$ would particularly be realised with the hostage taking the form of generalised purchasing power, and indeed this is the approach we shall take in further analysis of this model. But we are taking the situation back a little from where Williamson sees it. If a monetary economy is already in existence (and so the valuations are monetary ones), the uncertainties of team production relate to the realization or otherwise of monetary demand). But we are imagining a pre-monetary economy in which all initial valuations are based on the utility obtaining from different real goods. What can the firm use before any real goods are produced?

In the previous section of this chapter the models of Kiyotaki and Moore and Andolfatto and Nosal explained how the paper of firms or individuals would not necessarily be resaleable without some form of 'bundling' of the risk of default. We propose a third party that can ensure that generalised purchasing power is available for the firms to give to their employees/suppliers. It has the power to enforce the firm to make good on their promises and backing for the purchasing power they issue even if the firm should fail to produce as contracted.

By issuing purchasing power as its own liability while creating a liability on behalf of the firm in the form of a loan, commercial banks can fulfil the role of providing the 'hostage' in the form of money. This then allows the efficient outcome of team production. Moreover, money's liquidity and generalised acceptance means that it is valued by employees/suppliers *more* than a 'hostage' in the form of real goods would be. This has the effect of increasing α in equation (2.13) with the effect that the firm can lower $\hat{w}$, thus increasing its profit by the margin of the 'liquidity premium' offered by money.[5] The role of h here also points up the fact that the production and lending

[5] The benefit for the firm is of course at least partially offset by the payment of interest.

process involves valuation by the firm and its employees and suppliers about how the values in real goods of $\hat{w}$ are converted to the monetary value αh. The issue of how the money is valued will be discussed at greater length in Chapter 4. We might also regard the 'hostage' as playing the role of increasing the Keynesian 'weight of evidence' in favour of the probability of completion of the contract.[6]

2.4.4 Further Issues Raised by the 'Hostage' Model

Williamson goes on to discuss certain issues relating to a 'hostage' type contract, and some of these are relevant to the money contract we have been discussing. There is the problem that the employee/supplier may end up with the upper hand, and already having access to generalised purchasing power, may shirk in some way. A solution to this problem might be for the firm to issue a 'hostage' whose α is less than 1. Although this means the hostage may be of little value to the employee/supplier its offer acts as a screening mechanism as its expropriation would result in a significant loss to the firm. In the initial early monetary case we have described where money is primarily a claim to a specific firm's goods, then this is true in the sense that the firm stands to be bankrupted if it cannot repay its loan, whereas the expropriation of purchasing power has limited value to the suppliers/employees if the firms output does not materialise as a result of their shirking/non-delivery. Once the monetary economy becomes established, however, the shirking is increasingly a problem to the firm rather than the supplier – who can utilise his/her purchasing power even if the firm's output is delayed or absent. This may explain why in a modern monetary economy payment to employees and suppliers is usually made *after* some labour or capital goods have already been supplied.

[6] See the discussion of uncertainty and probability in Section 1.3.

The problem of unforeseen contingencies means that even the 'hostage' contract may still be incomplete, and some scope for renegotiation which does not obviously give one party the advantage over the other may be required. Here the banks play a role in their enforcement of the repayment of loans by firms and their support for money as universal purchasing power.

2.5 Conclusion

The very existence of money is evidence of some form of disequilibrium in the real economy, since once such an equilibrium were to be established there could be no further transactions that were not already perfectly predicted (or at least their probability not perfectly covered by insurance), and therefore there would be no reason to value and hold money.

For Kiyotaki and Wright agents accept a commodity or token they cannot consume in exchange for goods, because they are at least as likely to meet another agent who will exchange for this as for their production good. But the calculation only holds if all start doing this at the same time. Anonymous matching in exchange is therefore not likely to account for the origin of money, although it does show how once money exists and is valued, it is likely to be used for exchange. What is more, there is no explanation in these models for the valuation of money. The experimental studies of Duffy and Ochs tend to confirm these problems for the theory.

The models of Andolfatto and Nosal and of Kiyotaki and Moore show agents accepting in exchange for goods a promise to supply a good they *do not* wish to consume, because they cannot at any time exchange directly their own production good for goods they *do* wish to consume. The issue of claims to dated output does seem to be able to account for the creation of transferable credit, but there is a problem of its general circulation. A certain level of trust and a certain frequency of meeting is

required with those who do ultimately wish the traded-for-exchange commodity (whether as the commodity itself or a promise to supply it), and both of these sets of authors recognise this and address it by modelling some form of 'bundling' of promises to reduce the perceived risk to those accepting them.

We have generalised the arguments for the role of circulating debt where there is the dated supply of goods in our team production/hostage model. We have shown that for self-interested agents able to order the uncertainty surrounding a contract under different costs for the other contracting partner, it is plausible for them to use a form of token that represents a promise to supply a portion of output. We have also argued from this model that where the token is managed in a way analogous with the 'bundling' of the debt circulation models cited above, this can enhance its use.

Our model shows the individual motivations and a potential mechanism by which intrinsically worthless tokens may become acceptable means of exchange when they are guaranteed claims to future output. Once the initial agreement to pay the banker for his enforcement services is made, the motivation for accepting these tokens thereafter is a purely individual one. If it is known that there is a mechanism in place that will force firms to give up part of their output in exchange for tokens, these tokens will have value to each individual quite apart from their 'public good' benefits of enhanced exchange. No collective agreement or convention is required to establish the acceptance or valuation of money in this case. Moreover, by ensuring a due share in the increased output of team production an improved use of available resources is enabled that allows the production of goods that would not otherwise have been achieved. The existence of money can increase output as a whole.

The strength of the model is not in the logical certainty of the described outcome, but in its plausibility given an average combination of human suspicion and

willingness to co-operate for mutual advantage. Of course the model delineated is very different from a modern economy. There is initially only one productive ‘firm’, only one ‘bank’ and no bank deposits, and no government sector or central bank. Outstanding issues are how this might translate to the real monetary economy, with its existing institutions, and why generally there is one money with a value against all goods in any economically developed area. We will address these issues in the next two chapters.

Chapter 3. A Monetary Theory of Production

3.1 Introduction

In the previous chapter we have discussed the attempts that have been made to explain theoretically how money and its valuation can arise in an equilibrium in which all goods (endowed or produced) are ultimately consumed. We have seen how agents can use debt instruments to overcome co-ordination and/or communication problems, and how the circulation of these can be enhanced when these instruments are bundled together to diversify the risks of non-fulfillment.

The team production and 'hostage-taking' model of the previous chapter demonstrated some key points. Firstly, we have the problem of uncertainty over a bilateral contract for production. Even the apparent willingness of both parties to co-operate may not be enough where the labour or resources have to be provided some time before production is completed. Secondly, the uncertainty problem can be significantly alleviated if some guarantee can be given for the credit contract and the default risk is spread by the issue of tokens of generalised purchasing power. Thirdly, once the tokens representing a claim on production exist, they can indeed serve as an aid to efficient exchange when more commodities become available. Finally, by serving as a means of exchange and provided there is an expectation of them retaining their value, these tokens are automatically a store of wealth if held.

We described the intuition that there is a strong link between production and money. We now want to explain how real world institutions relate to our generalised model. Within two particular schools of economics which firmly place themselves in opposition to the neoclassical mainstream, it is accepted that the existence and value of money are inextricably bound up with production and that its subsequent role in exchange is secondary to this aspect. Post-Keynesian (PK) monetary theory and the Circulation Approach (CA)[1] both stress the importance of initial finance in starting the production process; circuit theorists in particular emphasising that this finance is required to hire the labour required to manufacture both consumer and capital goods (see Graziani 2003, p69 and Rossi 2003, p343). Both schools trace their conception of money from Keynes who, when he was working on the *General Theory* was seeking a 'monetary theory of production' where money was one of the 'operative factors' and 'played a part of its own' (Keynes 1973a, pp408-409).

We will outline Post-Keynesian monetary theory and the Circulation Approaches separately and in some detail before discussing attempts that have been made to integrate the two approaches on the basis of their considerable common ground and complementary views of money and production. Using the compatible features of PK monetary theory and the CA we go on to characterise the monetary flows of a modern economy using a rigorous balance-sheet approach in the spirit of Rossi (2003, 2006). We examine the roles of Commercial Bank Deposit Money (CBDM), Central Bank Deposit Money (SBDM) Deposit Holding, Liquidity Preference, Interest and the Central Bank in these flows.

We then discuss an area that is particularly controversial for the type of approach we are analysing. The acquisition by firms of monetary profits is particularly

[1] In this thesis we shall consider the 'Circulation Approach' and the 'Theory of the Monetary Circuit' to be synonymous, but see the comments in section 3.3.

problematic from the point of view of the strict 'monetary circuit' of the CA. The final section summarises the chapter and suggests an answer to which way the causal arrow runs between money and production. Is it from money to production; from production to money; or both directions equally?

3.2 Post-Keynesian Money

The Post-Keynesian (PK) school of economics rejects the mainstream interpretation of Keynes's ideas in the *General Theory of Employment, Interest and Money* (Keynes 1964[1936]). This interpretation takes the form of the ISLM construct, in which the interest rate adjusts to ensure simultaneous equilibrium in both the market for real goods and the money market. Moreover, the apparent assumption in the *General Theory* of a fixed supply of money is also rejected, in favour of money's 'endogeneity' to the demands of the real economy that appears in Keynes' writings both before and after.

> [For Keynes], capitalism was seen to operate in a credit-money economy permeated with uncertainty…Historical conditions and historical time take precedence over mechanical equilibrium models operating over logical time' (Rousseas 1992, p12)

The central claim of the Post-Keynesian school that determines its approach to money as that of 'non-ergodicity'. This is the view that 'due to the permanent evolution of the economic environment reliable information upon which to base prediction is simply not available' (Fontana 2000, p30). Moreover, because the making of a decision may alter the environment in which that decision is taken, such a decision is effectively irreversible. The consequence is a tendency by both consumers and firms to postpone decisions by holding money. In the Post-Keynesian view the nature of money means that firms cannot manufacture additional liquidity at will when the demand for it increases (there is a near-zero elasticity of supply), nor does an increase in the price of

money (the interest rate) caused by an increase in the demand for liquidity result in an increased demand for some other asset with a high elasticity of production (there is a near-zero elasticity of substitution). The implication of this is that the demand for money is much more likely to persist than that for other goods, and it is likely to be held as a store of value despite a poor financial rate of return.

Another important role for money emphasised by Post-Keynesians is the fact that the existence of money means that nominal contracts can be made, such as wage settlements, as a way of minimising the impact of uncertainty for individuals. The basic three tenets of the Post-Keynesian view of money are thus:

1. The pervasiveness of uncertainty as distinct from calculable risk.
2. The historical time within which production and all other economic events take place in an irreversible fashion.
3. The existence of a credit-money economy of forward contracts in which the money supply has initially a zero cost of production (Rousseas 1992, p13).

The importance of the first tenet for money is that the impossibility of calculating risk across a series of possible outcomes means that sometimes the *propensity to act* (derived from subjective probability and the weight of evidence favouring that probability) is very low or completely absent.[2] In this case money serves to defer decisions and avoid commitments at minimum cost. Our team production/hostage model in Chapter 2 has shown how the creation of money can help to compensate for commitment problems in production but the same is true as it circulates from hand to hand. At any time a holder of money can delay a purchase because he/she feels that the 'weight of evidence' is less than adequate to decide on

[2] See discussion of uncertainty in Chapter 1.

expenditure or investment of the purchasing power represented by that money. The effect of the creation of money in the face of uncertainty, as in the case of our model, is a forward contract that must determine in advance (if firms are to recoup their monetary outlays, and thus restore their asset-liability positions) future sales prices as well (Rousseas 1992).

The second tenet means that real commitments in the form of using labour and goods in production or in exchange are not reversible without cost (if at all), and so the loss of value from the delay in utilizing real goods that is entailed by holding money and failing to initiate production may be the lesser of evils, if there is a prospect of addition to the weight of evidence leading to a greater propensity to act in the future.

The third tenet, 'the endogeneity of money', requires more extensive discussion. In terms of our model in Chapter 2 we saw how a 'hostage' could increase the 'weight of evidence' in favour of the completion of a contract. Yet we specifically envisaged a situation where a firm had no surplus resources which they could offer as a 'hostage'. In this case the firm had to mobilize their potential output by contracting with a bank who could enforce the creation and allocation of this output. This enforcement contract, is marked by a token standing for the potential output to be transferred. Because this token stands for the delivery of the good rather than the good itself, it need not be converted into the real output of the firm immediately or at all. Thus the token has a 'liquidity value' over and above its value in terms of the real output of the firm. This liquidity is increased if the token is validated for the output of more than one firm, by virtue of multiple contracts between the bank and different firms; one form of the 'bundling' of Chapter 2. The liquidity of these tokens, and their representation of real goods, combined with the absence of any need for them to have intrinsic value (paper

will do as well as gold as long as forgery is difficult), makes them conform to money as it exists in a modern capitalist economy. As this money enters the economy,

> [i]t is not so much the demand for money that takes primacy, but the flow of credit-money to the industrial sector that is of critical importance, in analysing a capitalist system (Rousseas 1992, p48).

Thus it is primarily changes in economic activity that determine the demand for bank loans and the creation of money. The credit-money created in the contract is in the nature of a financial asset to the worker/capital goods supplier and a liability to its issuer. This means that the minimum economic environment must include:

1. The existence of legally enforceable contractual agreements.
2. The existence of a clearing mechanism for the various tokens issued – either a single money-issuing authority, or an over-arching 'meta-authority'.
3. The requirement that the monetary and financial system have the 'confidence' of economic agents (Moore 1988, p20-1).

This may lead to the existence of the institution of a 'central bank' which reckons the value of the commitments issued by separate sub-authorities (the commercial banks) by a common yardstick to fulfil condition 2, and offers additional tokens of value to the commercial banks to ensure that their assumption of the uncertainty of contracts and the additional uncertainty derived from the existence of money itself is not so great as to threaten confidence in the commercial bank network. The latter 'lender of last resort' function fulfils condition 3, and it is perhaps natural that the same power behind the central bank, the authority of the state, should establish the legal and regulatory framework required to fulfil condition 1.

All this preceding is often implicit in Post-Keynesian analysis, with the prime focus on the relationship between the 'authority' of the central bank and the 'sub-authorities' of the commercial banks. This perhaps stems from the root of much of the Post-Keynesian literature in the counter-response to the monetarist arguments of the 1960s and 1970s. This aimed to combat arguments for a money stock that could realistically be held constant by the central bank, and that therefore might enter as an exogenous variable in the activity of the real economy (at least in the short run).

> The conventional explanation is that by open-market sales or purchases the central bank is able to reduce or increase the high-powered base at its initiative….The fundamental point, however, is that the high-powered base is no longer rigidly tied to any exogenous gold stock. Central banks always possess the ability to *increase* the base, so as to support any increased nominal volume of bank intermediation. But they in general do not have the same ability to *reduce* the base and with it restrict the nominal volume of bank intermediation. There is thus an important *asymmetry* in the ability of central banks to initiate changes in the base (Moore 1988, p15. Italics in original.).

The argument is that firstly the central bank is limited in its ability to deny its funds (base money) when banks require it to satisfy fellow banks' or their customers' demands, without putting trust in the banking system as a whole at risk. Secondly, to the extent that the central bank does exact a price, in the form of the interest rate charged on 'last-resort' lending or in incurring regulatory displeasure (so-called 'frown costs') in the modern financial environment commercial banks are able to seek alternatives. These alternatives include issuing marketable certificates of deposit and acquiring deposits issued abroad denominated in central bank currency (such as so-called 'Eurodollars').

Important corollaries follow from Post-Keynesian monetary theory:

1. Supply and demand for money are not separable

2. Whatever the accounting correspondence between saving and investment flows, when banks create credit they issue the borrower with deposits, and so no deferral of present consumption is required.
3. Effective demand originates from the holding of money. If agents keep holding it rather than spending it on consumption or investment goods, then effective demand is reduced and unemployment is the likely result.
4. The endogeneity of money, and its credit-led creation, means that the deficit-spending required for the growth of aggregate demand becomes possible.

Thus for Post-Keynesians money is 'endogenous', in the sense that it enters the economy during normal economic processes. It is certainly not, as in the equilibrium models of the previous chapter, an exogenous variable in a model of exchange. Endogenous money is created as assets are produced and financed and destroyed as positions are liquidated. The consequence of this is that loans make deposits, deposits make reserves and money demand induces money supply. Any shortfall in reserves is made up from borrowing central bank money from other banks or the central bank. To substantiate the reality of this view, Pollin quotes a US central banker as saying: 'In the real world banks extend credit, creating deposits in the process, and look for reserves later' (Pollin 1996, p495).

If the demand for money is the only driver of money supply, and is always fully accommodated, there can be no excess demand or supply of money. There is no way of injecting unwanted money into the system, since the creation of money always requires two parties (a lender and a debtor) to enter into commitments. Profit-seeking behaviour

and entrepreneurship by both firms and banks ensure that the demand of credit-worthy borrowers is met.

3.2.1 Horizontalists and Verticalists

Within the general view described above there have been important differences. In particular there has been debate between those arguing that in general the central bank accommodates all demands for reserves and so imposes no quantity constraint on the issue of money; and those who argue that while the issue of money is primarily driven by the demand for loans, the central bank has some powers to restrict this, with the consequence that banks are constantly looking for alternative sources of reserves.

Pollin (1996) characterises the debate as being about how banks find the additional reserves. He states the Horizontalist or *accommodative* view as being that of the necessity of central banks to accommodate the needs of commercial banks for reserves. If they did not, the viability of the financial structure and thus the economy would be threatened. The central banks provide these reserves via open-market purchases of securities or by lending at the current discount rate. In this way they can influence the cost, but not the quantity of reserves. The opposing *structuralist* view is characterised by the argument that, because discount window borrowing is not a perfect substitute for open market operations, the central bank can use the latter to place some restraints on the reserves of commercial banks, but this restriction, while it exists, is considerably weakened by the ability of banks to find other sources of reserves on the money markets. Pollin argues that there is strong econometric evidence for money's endogeneity *and* for the structuralist view in particular in the form of the testimony of central banks and in Granger-Sims causality tests showing the link between deposits and reserves and loans and deposits. He finds a significant upward trend in the loan/reserve ratios of banks as a result of liability management by commercial banks

and relatively weak substitutability between borrowed and non-borrowed reserves. He finds that causality testing between central bank and market interest rates indicates substantial interaction between them and evidence that in any case other factors carry the predominant explanatory power in explaining interest rate movements. Pollin makes the point, however, that the differences in emphasis are less important than the fact that both approaches make a significant break with orthodoxy in assuming that the quantity of credit money is fundamentally demand-determined. Moore (1988) also finds econometric evidence for causality from lending to monetary aggregates and from monetary aggregates to the monetary base.

Nell (1996), Fontana (2000) and Rochon (2003) all argue that Post-Keynesian monetary theory has not, however, fully specified the nature of money or how it is created, being more concerned with its functions and effects once in existence. For this in the context of production we now turn to the Circulation Approach.

3.3 Money in the Circulation Approach

The Circulation Approach (CA) or Theory of the Monetary Circuit can be regarded as the 'smallest common denominator' of a diversity of sources, and not as a comprehensive theory (Deleplace and Nell 1996, p10). It is a line of economic thought that explicitly links private sector production with the creation of money, giving much less initial emphasis than PK theory to the interaction between the commercial banks and the central bank.[3] Money is thus primarily considered in its role as a means of payment and is identified with the flow of payments performed over a period of time. The stock of money is no longer a given parameter, being dependent on the balance of monetary flows.

[3] This is particularly true for the Chartalist wing of Post-Keynesians, who trace the origin of modern money fully back to the state (Wray 2003).

Graziani (2003, p1) traces the history of this approach back to Wicksell, and identifies Schmitt, Parguez, Lavoie as recent expositors of the theory.[4] But the first full acount of the CA in English was probably given by Graziani himself (Graziani 1989). Over the decade and a half since there has been an increasing literature in English dicussing the details and implications of the CA: see for example Bossone (2000, 2001), Deleplace and Nell (1996), and Graziani (2003) again.

The circuitist approach makes it clear from the outset that money is a token:

> [A]n economy using one single commodity, for instance gold, as a general intermediary of exchange and as a unit of measurement of prices…still falls within the category of a barter economy since the commodity money is privately produced along with all other commodities…A true monetary economy necessarily makes use of a token money (Graziani 2003, pp58-9).

This is in contrast to a Wicksellian credit economy where commodities are exchanged against simple promises of payment (IOUs) accepted by each agent on the basis of mutual confidence. The circuit approach defines a true monetary economy as one where bilateral credit, while it may act as a means of exchange, does not when exchanged cancel the debt that gave rise to the promise to pay. Were this not the case, then buyers would be exchanging a promise to pay for real goods, giving them a potential seignorage privilege should they fail to fulfil this promise. Such a possibility should not be part of a true monetary economy. A true monetary economy is thus one where:

1. Money is a token
2. The use of money involves a final payment
3. The use of money should give no seignorage privilege to any agent (Graziani 2003, p60).

[4] See for example Schmitt (1996), Parguez (1996) and Lavoie (1996).

To satisfy these conditions payments must go through a third party (such as a bank). Once payment has been made using credit issued by a bank, no debt remains between the agents, only between the purchaser and his/her bank. In this way final payment is made without any seignorage advantage to any agent. The same principles apply to commercial banks. If they are to make mutual payments to settle discrepancies between credit issued by them and deposits made with them, they too must do so by making final payments that do not entail seignorage privileges. Thus there is a role for a central bank to intermediate payments between commercial banks.

There is thus a natural association, as noted by Keynes in the *Treatise on Money* (see Keynes 1930[1971], pp163-165) between the production process on one side and the creation, circulation and utilisation of money on the other (Fontana 2000). In the circulation view the generation of the flow of money results from negotiations between banks and firms, rigorously regarded as separate entities, on the credit-money market. This in contrast to the idea of a stock of money balances which is held by savers as a result of their portfolio choices on the financial market.

Proponents of the Circulation Approach insist that money is primarily an outcome of the production process which cannot take place, because of time and uncertainty, without an issue of credit that allows firms to pay the wages and for the purchase of capital goods before production is completed. The determination of the level of economic activity is thus the product of a 'triangular' negotiation over credit between commercial banks and firms (Graziani 2003, p61). Wage-earners spend the wages thus received and these expenditures return to the firms in payment for their produced goods, or for securities offered by the firms. On receipt of these expenditures the firms can repay the banks, in which case the money is destroyed, and the monetary circuit is complete. The circuit can be divided into two phases, that of 'Initial Finance',

which is the bank credit supplied at the cost of a short-term interest rate, and 'Final Finance' which is the return of money to firms following sales of production and/or sales of securities to individuals. If consumer goods firms can capture all of the expenditure arising from their borrowing, then at the end of the production process they will be solvent without any further intervention (although at the cost of paying a return to securities issued), but if money is held up in the form of hoarded cash or bank deposits, or destroyed in the purchase of government securities from the central bank, banks may have to roll over credit into the next production period.

Money is issued primarily as a flow of endogenous credit, and only secondarily forms money balances as a consequence of portfolio decisions, uncertainty or contracts. Money is endogenous as a consequence of its creation in the process of production and irrespective of the willingness of central banks to accommodate any increase in the demand for money with the required increase in reserves, although reserves may play a role in determining banks' lending behaviour.

Since the advance of money facilitated by bank-credit to firms is essential to allow firms to distribute income as production begins, the integration of money in the economic system occurs as output is specified, and not subsequently as in the exchange economies of general equilibrium models or as presumably is the case for the Andolfatto and Nosal and Kiyotaki and Moore models of Chapter 2. The circuit approach starts with money as purchasing power, treating it only secondarily as a stock of wealth.

The circuit also implies that, even if the costs of production in the current period were the same as those incurred in the last period, firms cannot use present proceeds from the past sale of commodities. This implies that, even although the real economy involves many simultaneous and overlapping circuits, loans never lead to more than a

temporary increase in the money stock. The fact that production processes run continuously need not imply that the pattern of circulation will work differently.

> Processes take time; production starts at the point where the raw material is acquired and set up for processing, and finishes when the good is turned over to be marketed. There is still a definite sequence to the operation, and this sequence defines the relation of the process to other processes (Nell 1996, p289).

The quantity of money as a stock, subsequent to its creation, depends on household liquidity preference. If there is a persistent positive level of uncertainty and no growth a steady-state may exist with constant output and a constant issue of loans and money. It follows that a certain level of lending is rolled over each period by banks to account for a constant level of deposit holding by wage-earners.

The main features of the monetary circuit that will be most important to our subsequent analysis are

1. Money is in the nature of credit money and in modern times is represented by bank credit.
2. Credit money is created whenever an agent spends money granted to him by a bank and is destroyed whenever a bank credit is repaid.
3. Money, being produced and introduced into the market by means of negotiations between banks and firms, is an endogenous variable.
4. A complete theoretical analysis has to explain the whole itinerary followed by money, starting with the moment credit is granted, going through the circulation of money in the market, and reaching the final repayment of the initial bank loan. Money being created by the banking sector and being extinguished when it goes back to the same sector, its existence and operation can be described as a circuit (Graziani, 2003, p25-26).

In descriptive terms, a firm seeking to produce output in a time-consuming process, must obtain the credit it requires to pay wages and to purchase capital goods

from a bank before production can start. Once this output is produced, it is sold for money in the market, and if the sales revenue of the firm is equal to its expenditure, then the loan can be repaid in full and the circuit completed. Under strict conditions, namely that there is one firm producing consumption goods; that the sole expenditure of capital goods firms consists of wages and that all wages are spent on consumption in the same 'circuit' in which they are received, then the matching of firms' revenue and expenditure is guaranteed and all loans issued in one circuit are repaid in the same circuit. Thus no credit or money exists longer than one circuit period. Within the circuit however, the demand of firms for the return of the titles to their credit gives value in exchange between those receiving these titles in wages and others with goods and services to exchange.

The circuit explains the acceptability of money and its value as being directly a consequence of the final destination that is implicit in the contract of its issuance. The credit issued by the banks to firms becomes acceptable as a means of exchange to individuals because the issue of credit to firms involves an implicit contract that guarantees that money will be demanded in exchange for output by a firm using it as expenditure. A central bank can be brought into the picture subsequently, because the triangular money-creating contract need not only be one of commercial banks, firms and wage-earners to create Commercial Bank Deposit Money (CBDM). It can also be one of the central bank and two commercial banks when banks borrow from the central bank to create, or the central bank, the government and a private agent when the government makes a payment. The latter two contracts create Central Bank Deposit Money (SBDM) (Graziani 2003). For the CA, however, private sector triangular contracts are autonomous, and being responsible for the creation of the vast majority of money in a modern economy, should be the main focus of analysis.

3.4 Integrating the Post-Keynesian and Circuitist Approaches

3.4.1 Intellectual Convergence

Recent years have seen attempts to integrate the Post-Keynesian and Circuitist views of money on the part of, for example, Deleplace and Nell (1986), Fontana (2000) and Rochon (2003). Both approaches are to be distinguished from mainstream theory by putting the problems of money at the centre of economic analysis, with money being both endogenous to real economic activity and central to problems of effective demand and crisis (Deleplace and Nell 1996).

The common thread running through both Post-Keynesian monetary theory and the Circulation Approach is that production, employment and investment cannot be understood or controlled apart from the monetary system. As we have demonstrated in our team production/hostage model in Chapter 2, money can allow more efficient joint production to take place where otherwise it would not, by increasing the propensity to act in the face of uncertainty. And it does so in two ways, one of which has far-reaching consequences that are not wholly positive. While it almost certainly has not arisen and is unlikely to arise in exchange, as we also argued in Chapter 2, its creation is encouraged because, by enabling diffuse exchange throughout the economy, it gives point to specialised production where the number of inputs is at least as great as the number of outputs. So it is important to state that money's role in exchange is important as a reason for its subsequent circulation, and thus its liquidity premium, even although it cannot be created without production.

Both approaches see money as *primarily* endogenous to the production process, being created for the purpose of production. In this process it must be created along with debt, and it is this debt that provides its backing and ensures liabilities and assets

match up for all economic agents. We will return to this idea in Chapter 4. Rochon (2003) distinguishes between the 'institutional' endogeneity that Post-Keynesians emphasise in their discussion of the relationship between commercial and central banks, and the Circuitists' focus on the relationships that exist in the process of production. These latter relationships are irrespective of specific institutions, and result in the liabilities of banks being recognised as means of payment. Whereas Post-Keynesians in part view money as a stock of value with demand and supply functions mediated by a price in the form of the interest rate, the circuitist approach is that credit and money are always flows that respond first and foremost to the needs of the economy to reproduce itself and grow. '[E]ven if we envisage a world of perfect certainty, firms and the state would still need access to bank credit' (Rochon 2003, p127), so that although uncertainty can explain why money remains in the economy unspent, it does not explain its existence.

Both Post-Keynesian monetary theory and the Circulation Approach deal with credit-money as being required because of the time taken for production. They do not assume the joint movement of prices and quantities; demand and supply of credit are independent. They see the economy in a continual process of adjustment, without equilibrium as a significant concept, since the economy is path-dependent. Consumption patterns, organisation of production and ways of market-adjustment are changing, along with the level of activity. The quantity of money in circulation is the result of endogenous, purposeful actions by particular agents rather than an exogenous stock. It is not dependent on the supply of some commodity such as gold; it has no independent supply and demand schedules and is not determined by a policy decision by the central bank.

Both PK and CA see an asymmetry between firms and households. Households must generally accept wages and prices given by firms. This arises particularly as a consequence of the access to credit. The purpose of firms in the capitalist economy is to make monetary profit – individuals only get purchasing power to the extent that they participate in the monetary economy.[5] Investment by firms is autonomous and unconstrained by saving. Feedback of effective demand may mean firms opt to settle at neither maximum capacity, nor the full-employment level of activity.

Both approaches attempt realistic characterization of the monetary economy with institutions and technology influencing actions and their ordering. Uncertainty is regarded as inescapable, although the Post-Keynesian emphasis is on the uncertainty that exists because the consequences of decisions extend forward in time and the Circulation emphasis is on the lack of co-ordination between multiple credit-induced circuits (Deleplace and Nell 1996, p29).

Thus PK and CA share the view that:

1. The supply of money is endogenously created by banks through their normal lending activities
2. Banks have to remain solvent and make profits
3. Central banks are lenders of last resort, supplying liquidity on demand
4. The central bank interest rate is controlled by open market sales and purchases of government securities and by setting a discount rate for lending central bank currency to commercial banks (Deleplace and Nell 1996, p22).

[5] Even though consumer loans exist, accessing them generally depends on having an income from a firm.

3.4.2 Divergence

There are some important different emphases of the two approaches. For Post-Keynesian monetary theory money is a credit, a financial asset and a link between present and future, so portfolio analysis is important, particularly in the light of uncertainty leading to the holding of money and the consequences of this for economic activity and employment (Deleplace and Nell 1996). Moreover, the financial asset that counts as money may be contingent upon legal tender laws or which commodity has the greatest liquidity. The Circulation Approach, however, sees money as fundamentally different from other financial assets, being a means of the circulation of real goods because of its generalised purchasing power. In this view, while it is in circulation it is not acting as an asset. In regard to the nature of money, this latter approach is the one we have adopted. The law cannot prescribe currency or its derivative commercial bank issued deposits as a means of payment in all circumstances, although it can be made attractive by insisting that it must be used to pay taxes.

There is a tendency in Post-Keynesian theory to continue to see money in terms of demand and supply; with an ongoing debate over the nature of the supply curve. The idea of a supply curve is redundant in the Circulation Approach because money creation arises from a joint decision by banks and firms to enter into a credit contract (Deleplace and Nell 1996). This is what makes money endogenous, with the direction of causality from lending to central bank reserves as a consequence of this (Rochon 2003). Derivative assets such as Certificates of Deposit (CDs) and Eurodollars are not therefore the source of banks' flexibility in expanding liquidity. They do not represent general purchasing power. For circuitists credit and money can always be created given a viable production plan proposed by a firm. This also means that there is no question of 'alternative uses' for commercial bank money, although to a limited extent there may alternative uses of reserves, where these are limited. The role of the central bank is thus

not to set the money supply, but to act as a 'clearing house' for interbank transactions, and to act as the financial arm of the state' (Rochon 2003, p135). In this role it sets an exogenous interest rate according to the economic objectives of the government such as controlling expected inflation or achieving a desired level of output.

Another distinction between PK monetary theory and the CA is that for the latter each circuit is sequential in time – the closing conditions of one circuit influencing the opening conditions of the next. There can never be an equilibrium (even an unemployment equilibrium).

3.5 The Balance Sheet Approach to Monetary Flows

We will now adopt a synthesis of the Post-Keynesian and Circulation Approaches to characterise a modern monetary economy. We will outline the creation of money in the process of issuing credit, particularly but not necessarily associated with production; the consequence of credit repayments being held up by holding of deposits and the role of the central bank and its money in allowing interbank settlement and the effect that an operational requirement for this money has on the banks and their clients We also detail the role of commercial non-money financial assets and the problems raised by the monetary nature of the returns to banks and firms in the form of interest and profits respectively. We will demonstrate the consistency of this approach by showing the various transactions using balance sheets for the sectors involved in which the matching of assets and liabilities is made explicit at all times (see Rossi 2006).

3.5.1 The Creation of and Destruction of Claims to Deferred Consumption

Production initially involves the organisation of resources (natural and manufactured capital goods) and labour, including that of entrepreneurs, into *firms*,

which are non-physical entities created for the purpose of carrying out production where this is anticipated to benefit those involved in its creation. As we have shown with our team production/hostage (TP/H) model in Chapter 2, this process involves a current sacrifice by wage-earners (treating labour and leisure as two aspects of the same good: wage-earners' time) and/or capital suppliers, with the expectation of consumption of an overall greater utility value at a later date. To be accepted by all parties the contract involved in the setting up of the production firm must benefit one or more parties without being to the detriment of any.[6]

As the TP/H model demonstrated, a problem of trust between the firm and suppliers may exist such that the risk of default on the contract appears to one or both of them to be greater than the benefit that will accrue. Thus there may be an advantage in the presence of a mechanism that guarantees to both parties that the deferred consumption they have been promised will be received at the end of the production period. This may be achieved by the distribution by the firm to the workers of tokens representing claims to deferred consumption that are guaranteed by a third party (the bank). If this claim is in a form which the bank will subsequently accept in repayment of any debt (including the one just incurred) at any time, then it is likely to be accepted by other firms for current consumption goods and also in exchange between individuals for previously produced goods. The latter is enabled where there is a reasonable expectation of subsequent trading for current production goods with some other producer who has a debt to this bank. In this way the tokens become a more or less universally accepted means of payment. These generalised claims, which we refer to here as Commercial Bank Deposit Money (CBDM) have been introduced into the economy to serve the purpose for the following reasons:

[6]To put this in neoclassical language, the contract must be 'Pareto-improving'.

1. Their value is backed by the neutral and powerful bank.
2. They are more divisible than real goods.
3. They are easier to hold than real goods, being small and non-perishable.

The claims have further value in that they can be held when the best choice of, and timing of, expenditure is uncertain enough to reduce the 'propensity to act' to zero, and so in this way it also serves as a store of value over time. The acceptability of these production claims is unlike that of a commodity money, in that it ultimately depends not on the desire of another trading party for some specific good, but on the presence throughout the economy of a significant number of producers who need to acquire again the tokens they have distributed, so as to repay their debts to the banker. Money and the conditions for its subsequent acceptance are thus created within the triangular relationship between banks, firms and the suppliers of capital and labour (Graziani 2003).

Loan Issue,Wage Payments and Production

Taking the production sector as a whole, including both consumer and capital goods, labour can for argument be regarded as the only production expense. **Figure 3.1** shows the balance sheet changes accompanying the issue of a £100 loan from Bank A, which is here representative of the entire banking sector, to Firm F (representative of the whole Consumer Goods firms sector) for the purpose of paying wages for a production process.[7] Absent here are capital goods, profits and interest on the loan; we shall consider all of these as we develop the model. At **Time 0** we assume the bank and the firm to have zero assets and zero liabilities. At **Time 1** Bank A creates

[7] The correspondence between these illustrative balance sheets and what a commercial bank might itself produce is not clear. Given that formal balance sheets are published only intermittently, and the notional quality of shareholders' funds, the creation of loans and matching deposits can easily by presented as reallocations of assets and liabilities rather than as increases.

simultaneously a loan asset for itself and a deposit liability in the name of Firm F to the value of £100. These are matched on the Firm's balance sheet, where the loan is a liability and the deposit an asset. The firm can now pay employed households (H) with the deposits and commence production. At **Time 2**, wages have been paid by Firm 1 and production is complete, but output remains unsold, replacing the deposit asset. The *expected* value of the production goods depends (explicitly or implicitly) on the contract struck between the bank, the firm and the workers, and will be anticipated to at least cover the wage bill and interest costs. The *actual* monetary value will depend on the effective demand present from consumers at the time the production process is completed. Uncertainty and the production time-lag mean that expected value of output and its realised value need not be the same so this is indicated by a question mark on the firm's balance sheet. We will discuss the significance of this for a developed monetary economy in Chapter 6. Meanwhile the wage deposit has been transferred to the H accounts held by Bank A.

The Nature of Production Loans

Even when firms appear to pay wages out of receipts, those receipts would not have been obtained without the labour previously employed. If this labour required the payment of wages prior to output being produced, a previous loan was required, and if receipts are transferred directly to wages this has the effect of rolling over the loan. The rolling over of such a loan is in effect indistinguishable from the taking of a new loan for the next tranche of wages. And while a steady state exists, there is no practical difference.

In reality, of course, production loans have varying maturity, and they may take shorter or longer time periods to create the output they initiate. But given this period the size of a loan must always be sufficient to create enough purchasing power to

compensate labour for loss of leisure (or loss of their labour for their own purposes) for the period until the loan is repaid from output sold in exchange for deferred consumption claims. The cost of deferring equivalent value consumption is shared by all those who hold the claims issued until the time of the loan repayment. (In a real economy this cost is diffused widely as claims issued for one loan are used to repay a pre-existing loan, but the cost exists, even if it is largely if not completely offset by the greater acceptability, measured by a liquidity premium, of these general claims.) The purpose of all such loans is therefore to create or increase production over a shorter or longer period. The sharing of these benefits and burdens is what makes the triangular contract of credit-money creation possible.

The Features of Banks

The bank has the following features:

1. The ability to issue guaranteed claims to deferred consumption
2. If he/she acts as a guarantor and processor of many such deferred consumption transactions, he/she is in a position to issue guarantees of consumption that are effectively non-specific as to the consumption to which they are ultimately a claim. This non-specificity makes these guarantees more attractive than the deferred consumption that any single producer can offer. Note, however, that uncertainty has not been fully eliminated, but it has been transferred from the future output of an individual producer to that of the value to the holder of all future output and so all future possible consumption taken together.
3. As the guarantor and processor of many such deferred consumption transactions, often involving the same parties on different occasions, a

> bank has privileged access to information about the likelihood of default by these parties and so plays a key role in determining whether production claims are issued and when the loans backing them are terminated.

The bank is likely to demand compensation for administering the issuing of tokens and for bearing the risk they have relieved from the contracting parties. This compensation for banks is generally in the form of interest payments proportional to the nominal value of tokens issued. The expectation is that the banker will aim to balance his/her interest income, his/her administration costs and the risk of default by producers (which will incur some sort of penalty for the banker failing to fulfil his/her part of the contract) so as to maximise bank income. This poses a problem for a picture of the monetary economy that takes the Circulation Approach seriously; a problem we will return to in a subsequent section.

Sales and Loan Repayment

Time 0 in **Figure 3.2** is equivalent to **Time 3** in **Figure 3.1**. When production is complete, it is sold to the workers, now in the role of consumers, in exchange for the deposits they have received as wages. This is shown at **Time 1**. The deposit with Bank A in the worker/consumers' name becomes once more a deposit in Firm 1's name. If the firm receives again all the tokens distributed as its workers purchase all of its output it can repay all of its production loan to the bank. At **Time 2**, the loan is repaid and all deposits (liabilities of that bank) are eliminated along with the bank's loan asset. This is the sense in which money is 'destroyed' according to the Circuit Approach. Thus the liabilities and assets of the banking system as a whole are kept in balance, and here

indeed returns to zero once the loan is repaid. The only final consequence of the process is the real one that workers have exchanged labour for consumption.[8]

Summarising the Role of Production Debt

The issue of the loan by Bank A, although apparently nothing more than the manipulation of balance sheets, has had significant real consequences, enabling new production and consumption, and the temporary lowering of transaction costs for the period that the claims were in circulation. How can something so insubstantial give rise to such significant consequences? It is because the claim issued by Bank A in the form of CBDM for labour services for the Firm, and subsequently to the Firm's output for H comes with an implicit guarantee. The nature of this guarantee is that the Firm will carry out its production, and will then exchange it for the CBDM issued whoever presents it to them. The firm honours this guarantee because it requires this money to repay its debt. The bank will endeavour to ensure that it does so because failure to repay the debt and the loss of that asset leaves the bank with an unmatched liability, in the shape of a deposit to the value of the loan issue.

3.5.2 Deposit Holding, Bond Sales and Final Finance

The simple circuit from bank to firm to worker/consumers and back to the firm for repayment of the full debt is not of course the whole story. Once money has entered the economy and is valued because it is demanded by firms for the purpose of repaying their debts, the existence of uncertainty and time-lags means that the effective demand implied in the initial triangular production contract may no longer be present.[9] Thus H may opt to defer their purchases of firms' production and continue to hold deposits with

[8] Where the original loan-issuing bank is different from that holding the firm's current deposits, the asset-liability positions of the individual banks are kept in balance by a transfer of central bank money. See discussion in the next section.

[9] The various reasons why this might happen; the ways in which it might happen and the macroeconomic consequences of it happening are discussed in Chapter 6.

Bank A (Graziani 2003). We can see the consequence of this in **Figure 3.3** at **Time 0**. Firm F, instead of having returned to a state of zero assets and liabilities, still has part of its loan liability matched on the asset side by unsold production output. Firms are thus prevented from repaying their loans as they might have anticipated.

There are various possible financial consequences of firms' inability to pay their loans. **Figure 3.3** also shows how firms can recoup the funds they require by issuing securities directly to H. At **Time 1** H exchange their secure, but non-earning money deposits for these riskier, but (presumably) higher earning bonds. They are riskier than deposits because they will only be repaid (with a concomitant transfer of deposits from Firm F to H) if and when Firm F does manage to sell its remaining output. At **Time 2** the firm can now repay the balance of its loan. For the firm, if they succeed in raising enough funds in this way to repay their bank debt, then there is no restriction to their acquiring lending for the next production cycle. It is important to realise that this is a simple process of financial intermediation, where pre-existing money is transferred from the individual who needs less liquidity to the firm that needs more. Here, unlike the issue of production loans, there is no creation of new CBDM.

Features of Bonds

To the extent that consumption goods firms are making profits, the share of income that households do not choose to spend on the acquisition of consumption goods reduces the profits of consumption goods firms accordingly (Parguez 1996). In Graziani's (2003, p114) description of the process, banks and firms compete for financial savings of households. Firms are offering high-yield securities to offset the liquidity benefits of holding cash or deposits. These securities are usually of longer-term than bank loans, and may be bundled by financial intermediaries to tailor the

specific liquidity and risk and return needs of firms and households respectively. The firms' incentive to issue securities will depend on:

1. The interest rate spread between securities and bank loans,

2. The impact of failure to repay bank loans on the availability of future borrowing facilities.

The securities offered may take the form of bonds (fixed-interest long-term loan contracts), or shares (contracts to share in profits, usually with control rights attached). Sales of commodities and securities taken together cannot exceed total wage payments. When interest is paid on bonds this monetary flow comes back to firms when spent on commodities, and so this does not count as a cost to firms (Graziani 2003). But it should be noted, however, that the extra commodities sold in this way must be produced by firms and if this is done at no additional cost it can only be by further reducing the purchasing power of wages by increasing the firms' mark-up on prices of consumer goods. Otherwise it would seem that firms could offer an unlimited return on securities to the extent that the convenience of holding money would be outweighed by this return. In summary, at the end of the production period, the liquid balances existing immediately after the initial bank loans have been made are reduced by an amount of expenditure by households in the goods market plus the amount of securities they purchase.

Consequences of Failure to Obtain Final Finance

If the firm does not succeed in selling enough securities to offset households' non-consumption of output, then it is dependent on the bank's subsequent decision. If the bank agrees to roll over the outstanding loan, and is willing to issue a further loan, then the firm can produce again. The level of subsequent production will depend on the

size of the total loan the bank is now willing to countenance. The firm must also now pay interest both on the part of the previous loan that they have been unable to repay *and* the new loan. Alternatively the bank may be unwilling to extend a further loan. If the firm is then unable to sell its outstanding output within whatever time the bank determines then loan default will be considered to have taken place.

Liquid balances held by single agents are not generally connected to finance for production or investment; the role of final finance being solely ease firms in paying off their bank debt within a single circuit. The sale of securities is one way in which investment can be financed, but this can only be true where either firms have already acquired bank loans to pay for capital goods or wage-earners hold money they have acquired from another source than wages Graziani (2003, p71). Graziani describes profits of firms as 'forced saving'. By putting the two together he can say that all investment leads automatically to the saving that 'funds' it. This agrees with the view of Moore (2004) who dismisses both the 'neoclassical view' that interest rates adjust to equilibrate saving and investment, or the 'Keynesian view' that incomes do. He argues that saving is simply the accounting record of investment, and so if there were no measurement errors they would always be identical. Saving can thus in no way be a cause of investment. Only in the case where all saving and investment are undertaken by identical units can aggregate saving and investment be both volitional and identical. Investment in a monetary economy is thus never limited by an 'insufficiency' of saving. The only *financial* limit to investment is excess money holding, since this will reduce firms' profits, increase their borrowing costs and impact upon their ability to repay bank loans.

If firms offer securities for sale at too high a rate of interest, they may actually divert funds from consumption; which would be to their disadvantage. This implies that

there is an optimal interest rate for firms to offer given a specific interest rate on bank loans and a known cost of loan default.

3.5.3 Liquidity Preference and the Determination of Interest Rates

A critical determinant of the flow of money into and out of deposits is the issue of 'liquidity preference': the extent to which an economic agent balances their assets between return and their ease of immediate exchange without significant loss. Keynes presented the liquidity preference theory of interest rates in the *General Theory* (Keynes 1964[1936]) and this was subsequently interpreted as explaining the demand for money. Bibow (2006) refers to Keynes's emphasis on the separation between the decision to spend or not to spend, and whether to hold wealth in the form of money or some other asset. It is the latter that is primarily affected by the rate of interest. Rates of interest, while determinants of effective demand, are determined exogenously with respect to income generation; so there is no supply and demand for credit in the way there is for goods and services.

As long as there exists a viable production process, credit can be issued at the cost of evaluating, recording and absorbing the risk of default, all of which are exogenous to demand. The marginal propensity to consume is affected by tax changes, changing income and changes in the value of capital, and

> the assumption of radical uncertainty of the environment dear to Post-Keynesians does not mean that agents do not make decisions (Monvoison and Pastoret 2003, p27).

If there are real constraints on the supply of credit they are primarily in the shortage of material and human inputs to production, or a lack of demand for planned output. The latter dependence on employment ensures that the actual quantity of credit issued is to some extent indeterminate. There is no guarantee that an increased desire to save on the part of households will necessarily result in reduced interest rates unless a

shift from deposit-holding to holding firms' securities outweighs firms' desire to supply securities to households.

Following Keynes then, changes in the rate of interest are determined by the desire of households and firms to acquire liquidity and the banks' willingness to tie up liquid reserves in supporting the holding of deposit liabilities in exchange for potentially risky loan assets. But there is no equilibrium rate of interest derived from the real rate of return.

There is particular uncertainty in investment decisions; especially surrounding the expected return (marginal efficiency of capital) and the future interest rate. Holding money is one way of guarding against an uncertain future, by keeping a relatively stable stock of wealth to hand. But increased desire to hold money that is not offset for a greater desire to hold commercial securities, will increase firms' need for credit. Uncertain expectations mean that there is no stable and unique liquidity preference schedule. Keynes' liquidity preference theory of interest was the

> …interplay of the terms on which the public desires to become more or less liquid and those on which the banking system is ready to become more or less illiquid (Keynes 1973b, p219).

Productivity and thrift are not real anchors of the rate of interest. The beliefs of financial market participants and the beliefs and policies of the authorities are important factors. We believe that the desire for initial finance alone explains the demand for credit, and is the basis for money creation. The other motives for holding money provide no explanation for money creation and the production process.

> Money demand for the finance motive and for liquidity preference covers quite separate cases. The former concerns firms' demand for credit from banks and falls within the sphere of production. The latter relates to the demands for liquidity (cash holdings) and for public securities, and is bound up with the financial sphere of the economy (Monvoison and Pastoret 2003, p35).

3.5.4 Banks' Liquidity Preference

Banks' *quantity* of lending is primarily determined by the state of their reserves (with liability management rendering this more flexible), but the *forms* of lending (whether loans, bonds etc) are up to them. Their reserves are required to meet demands of deposit-holders for cash, but in modern monetary economies perhaps more important is the quality and quantity of capital available to offset any loan defaults.[10] The level of risk they are prepared to take in terms of illiquidity and insolvency are opposed to the profit motive and concern for their reputation. In the behaviour of banking system there is likely to be an element of self-reinforcement, in that loans from one bank shift reserves to another.

Where the banks lend for the purchase of securities or even purchase these themselves, and when a large part of the private sector is keen to sell securities, then this results in a rise in the price of securities (a fall in interest rates) and an increase in the quantity of deposits held. There is an important role here for a Central Bank, of which we will say more in the next section.

Banks liquidity preference behaviour is determined by the uncertainty they face, and aims to minimize the risk of:

1. A liquidity crisis due to a large demand for cash by depositors or settlement with other banks – since liabilities are highly liquid compared to assets. (Securities are more liquid than loans in this regard, but their value can fluctuate.)
2. Profit/loss arising as liabilities exceed assets – because of excess bad loans or the loss of value of other assets.

[10] Thus the increasing emphasis on Capital Requirements in banking regulation.

A rise in a bank's liquidity preference is likely to lead to the rationing of credit as they limit their exposure to illiquid loans in contrast to more liquid assets. This may occur either because the interest rate high enough to compensate the banks' assessment of uncertainty over loans exceeds the firms' ability to provide an interest rate stream (See section 3.5.6), or there is such 'fundamental uncertainty' that the bank simply does not wish to lend at all, and so credit is rationed.

3.5.5 The Role of the Central Bank

In the modern state, the government has a monopoly on physical force and so it is natural that the government should provide the final backing to contracts through the legal system. Moreover, the government can use physical force on its own account to enforce its own purchasing and debt-collecting activity, in which State or Central Bank Deposit Money (SBDM) is created, circulates and is destroyed. The Chartalists even regard money as entirely a creature of the state and argue that the state uses its coercive powers to force the acceptance of tokens in exchange for the goods and services that it requires to carry out its functions (Wray 1996, Tymoigne and Wray 2006). By accepting these tokens when taxes fall due, the state acquires the power to establish them as a unit of account and gives them the status of a means of payment.[11] By insisting on credit payments of taxes taking place in central bank money, the central bank forces the other banks to hold deposits with the central bank, these deposits being increased when the government makes a credit payment to one of their deposit-holders and decreased when a deposit-holder makes a tax payment in credit money. Transfers of credit money between banks can then occur via their deposits at the central bank,

[11] The Chartalists see the whole monetary system as imposed by the state. In my view the state is responsible for the imposition of central bank money and ultimately responsible for enforcing the contracts involved in commercial bank loans, but the use of tokens of these loans in general exchange is a voluntary act arising from their superior liquidity to any other means of exchange.

allowing them to settle asset-liability discrepancies that arise as deposit-holders transfer CBDM between each other.

The Outward Path of SBDM

The central bank issues deposits to pay firms and individuals for goods and services including labour. Individuals and firms can pay the credit money received from the central bank into deposits with the commercial banks. These liabilities for the commercial banks are matched by increases in the deposits the commercial banks hold with the central bank when they present this credit issue to the central bank. Thus there is an increase in both the liabilities and assets of the commercial banks. Given reserve requirements either imposed by the central bank or required to avoid costly overdrafts, the commercial banks then have the option of drawing down their increased central bank deposits and converting them into central bank notes, if required, or more profitable forms of assets such as government bonds or loans. In many modern economies, there is no imposed reserve requirement, and so the nature of the assets held by commercial banks to offset their liabilities depends on their own assessment of their likely need to have central bank money available for the cash demands of their depositors and for their own transactions. This means that while there is clearly a relationship between the creation of loans (and thus the flow of CBDM into the economy) and the cost of access to reserves for commercial banks, it is by no means likely to be a mechanical and easily predictable one.

In our balance sheet example we have taken the case of Firm F at **Time 0** in **Figure 3.4**, where it holds unsold output and still has an outstanding loan of £50. We assume that the state purchases this output using SBDM at the price required to exactly cover Firm F's outstanding loan to commercial Bank A. At **Time 1** the SBDM deposits now form assets of Bank A, while there is an equivalent CBDM deposit forming a

liability for Bank A and an asset for Firm F. This now allows Firm F to repay its loan to Bank A. At **Time 2** Bank A is left with an SBDM deposit that matches the CBDM liability of the H deposit holding. While the SBDM deposit is clearly a more secure asset than the loan to Firm F, and can be converted into cash as demanded by Bank A's depositors, it is also a lower-earning one and so there is incentive for Bank A to use part of its SBDM deposit to purchase higher-earning assets.

The Inward Path of SBDM

When tax bills become due, individuals and firms pay these from deposits with the commercial banks. Deposits held by the commercial banks are decreased by the amount of the tax bill, as are the deposits of the commercial banks held by the central bank. In this way both the liabilities and the assets of the commercial banks are decreased. If the commercial banks guarantee to exchange state money (as cash or deposits) on a one for one basis then the value in terms of real goods and services of both commercial bank and central bank money will be identical, although individuals can only transact in cash or CBDM, and banks must complete all their transactions in SBDM.

In a democracy, the power of the state to issue money to make purchases and demand the payment of taxes must stem from the agreement of the population at large that this system is working to their overall advantage. For this to be the case the deferral of consumption that is represented by their acceptance from the government of central bank money and associated tax payment must be compensated for by the additional future consumption that the actions of government, thus funded, will provide. In this way the justification for the creation of money by government transactions is exactly analogous to that for the creation of money by private transactions; except that while such transactions in the private sector depend on a potential bilateral benefits, in the

public sector they depend on perceived overall social improvement. We will discuss this issue further in Chapter 4.[12]

Reserve Ratios and Transfers

Because of SBDM the importance of quantities of deposits depends on how they arrive on banks' balance sheets. If due to loans they have created their deposit/reserve ratio is reduced; if due to loans created by other banks their deposit/reserve ratio is increased, since the arrival of these deposits is accompanied by transfer of reserves from the issuing bank.

> [T]he rate at which the bank can, with safety, actively create deposits by lending and investing has to be in a proper relation to the rate at which it is passively creating them against the receipt of liquid resources from its deposits. For the latter increase the banks' reserves…whereas the former diminish the reserves… (Keynes 1971[1930], p22).

If all banks expand credit together the strength of the banking system depends on the central bank issuing enough SBDM to keep reserve ratios at 'prudential' levels. If there is a compulsory reserve ratio for commercial banks of SBDM deposits to total assets, the credit potential of the banking system as a whole depends on this ratio, the quantity of SBDM, the compulsory reserve ratio and the preference of the public for cash versus deposits (Graziani 2003, p88). If there is no compulsory reserve ratio and the public do not generally require cash, banks can expand credit to the point that their perceived risk of default outweighs their interest income. Note that this risk of default is now made a financial risk, rather than a 'real' one. The consequence of a loan default is that when the loan asset is 'written off' from the balance sheet there must be a compensating reduction in the liability side, as illustrated in **Figure 3.5**. At **Time 0**, a firm has an outstanding loan liability and unsold production. If it is unable to sell this

[12] Central bank money also moves into and out of the private sector as a consequence of Treasury Bond sales and repurchases and of loans to commercial banks at the discount window, but the balance sheet implications are essentially the same as described in this section.

production it may default on the loan. The bank must remove both the loan asset and the equivalent value from the asset side of its balance sheet (**Time 1**). This is effected by a reduction in shareholders capital and shows up as a charge against the current profit and loss account. The extent to which this process reabsorbs purchasing power depends on the valuation of the banks capital.

Should the transfer to other banks of SBDM have the effect of reducing these below the compulsory or prudent level (according to the prevailing regime) the commercial bank must thus acquire additional SBDM by the sale of government bonds, thus losing the return on these, or by borrowing from the central bank at the prevailing base rate.

The amount of reserves at the disposal of a single bank depends on the total amount of reserves created by the central bank and on the fraction of those reserves obtained by that bank – thus creating competition for depositing customers of other commercial banks, as they bring transfers of SBDM with them. The reserve requirement for a bank is of course lower when that bank has a greater share of the market for deposits, since a greater proportion of deposit transfers will be between customers of that same bank and so will require no SBDM settlement.

Monetary Policy and the Central Bank

Given that the main form of money circulating in the economy is that created by the commercial banks from their lending, it is clear that at best the control of the central bank over the money supply can be an indirect one.

> [T]he central bank cannot ordinarily control the quantity of money. Any attempt to do so succeeds only in temporarily disrupting the smooth workings of the system until the dormant credit money system can be activated (Mehrling 1996, p331).

While it is true that the central bank could control the quantity of SBDM issued, the very performance of its regulatory and enforcement role (and deposit insurance) tends to reduce the practical need for banks to maintain high reserve ratios, and even if it did seek to restrict supplying its money to commercial banks desiring it, the immediate effect is not to reduce the purchasing power of wage-earners, but to restrict the production activities of firms. Modern central banks mainly operate by establishing a rate of interest to stabilise the system of notes and bank deposits, while making loans and accepting deposits at that rate as the lender of last resort (Nell 1996). Nor is the central bank limited to providing reserves to prevent a crisis but is an integral part of the monetary circuit (Rochon 1999). The central bank exogenously sets the real and nominal rate of interest over which other interest rates are a mark up. Even this limited role can be damaging:

> Central bankers…believe that the consistency of the credit network requires the perfect stability of the value of money… Stabilising money prices of goods should protect wealth-holders against losses of purchasing power: money values of firms would thus rise; this increase in real wealth could support a sound increase in investment…The central bank's own thriftiness thus sustains the rentier economy…where the generation of wealth is not dependent on investment expenditures (Parguez 1996, p183).

We will return to these issues in Chapter 6.

Summarising the Role of the Central Bank

It should be clear from the above analysis that the collective institutions of government and the central bank play a huge and largely autonomous role in the shaping of monetary transactions. The main features of this role are:

1. Provision of the legal framework that supports commercial banks in enforcing repayment of loans, thus ensuring that the CBDM arising from loan contracts is valued.

2. Provision of central bank money by which transactions between banks and between individuals or banks and the state can be settled in monetary terms. This potentially enhances efficiency and competition in the commercial banking sector.

3. The autonomous ability of the government to make purchases of goods and services for collective use, by the issue of central bank money. The commercial banks match this with their own issued money (CBDM) through adjustment of their balance sheets. There are various reasons why the government chooses to acquire the goods and services it requires in this way rather than simply by confiscation (which it has the physical power to do). Firstly there is the issue of equity. The resources government requires to fulfil its delegated functions may not be held equally by all. By issuing its money in exchange for goods and services, and then selectively confiscating this money in the form of taxation, the government can redistribute the burden of providing its resources. Secondly, for this system to be effective it of course essential that the money the central bank issues on behalf of the government is accepted. This is achieved by the requirement that almost all individuals (including firms) have some tax liability, and by the fact that central bank money and commercial bank money (itself demanded for loan repayment) is always interchangeable at a rate of one to one.

4. By ensuring a demand for its own money for the payment of taxes and the settlement of interbank transactions and by taking advantage of the demand of individuals for the portability and liquidity of cash by monopolising its production, the government may hope to influence the quantity of CBDM issued. This is generally performed by setting prices (interest rates) for the

central bank's purchase and re-purchase of high-grade financial assets (open-market operations), and for the last-resort lending of central bank reserve money. This latter 'lender of last-resort' function together with regulations governing acceptable asset risk composition for commercial banks also gives the central bank a role in ensuring that commercial banks remain solvent and capable of allowing individuals access to their deposits at all times.

3.5.6 Interest Payments by Firms

We have suggested that the banker will expect compensation for the organisational and physical effort involved in his part in enforcing the repayment of the loan issued to initiate the circuit, along with the ultimate risk of default. Yet, as various writers have pointed out, the account of the Monetary Circuit given so far leaves no room for the payment of interest in monetary form (Bossone 2001, Schmitt 1996, Graziani 1989). As we have described it all of the money issued in the production loan contract is spent as wages and then exchanged for production, held as deposits or used to purchase bonds. There is no additional money with which to pay interest. There is no such barrier to the bank being paid in kind, since as long as the additional utility arising from the production process exceeds the compensation the bank requires there will still be a benefit to be divided between the other agents in the production process. But on the face of it there is no way of converting this additional output into money, since the firm cannot acquire more money from sales than it pays its workers. Since the only money existing in the market is the money that banks have lent to the firms they can only repay in money the principal and are unable to pay interest. They must therefore transfer part of their product to banks. Some circuitists such as Bossone (2001) and Schmitt (1996) regard the interest problem as insoluble. The interest must be paid from

money sales from workers, and so there must always be a repayment shortfall at the end of each circuit.

There is, however, an alternative solution to the interest problem, once it is understood that production and the monetary transactions that it involves do not (as indeed they cannot) occur instantaneously. The final destination of banks' net income is the payment of wages and dividends and to invest in fixed capital (Graziani 2003). Thus directly or indirectly this money eventually returns to production firms. If there is a positive time interval between issuing of the initial loan and the payment of the final wage and/or a positive time-interval between the first instalment of sales receipts and the last of any particular circuit, then a firm can pay interest to the bank in the form of money, receive it once more in money, use it again to pay its suppliers, and so use it to repay its loan in the usual way. Of course the bank or those to whom it transfers its interest payments may opt not to spend this money, which will leave a repayment shortfall for the firm, in the same way as money-holding by consumers.

The final effect of the dual passage through the firm of interest payments is in fact exactly the same as if there had been simply a transfer of goods in kind from the firm to the bank as compensation for loan provision.

> Firms must either sell part of their output and/or physical assets to the banks, or ask for extension in the form of new loans' (Seccareccia 1996, p411).

In the case of loan extensions firms become increasingly indebted to the banking system. In an economy with multiple consumer-goods firms, however, the interpolation of additional transactions means that the final recipients of goods purchased with money paid as interest will not generally be households employed by the firm that paid it. But the principle of the procedure is unaltered. In the final analysis, the payment of interest represents a transfer of real goods away from wage-earners.

There is an issue of timing; if extra money is not to be required, then interest payments must be recycled back to firms within the production period.

We show the flow of interest payments in **Figure 3.6.** At **Time 0**, a £100 loan has been paid and this money is seen as a deposit belonging to Firm F. At **Time 1**, an interest payment of £10 is due, and is transferred to Bank A. Bank A can simply represent this as a transfer from the firm's deposits to households deposits where in this case the households are employees of the bank. When these households spend to purchase goods from Firm F, the process is reversed and the balance sheet position at **Time 2** reverts to that at **Time 0**.[13]

3.6 The Nature and Role of Profits

One of the fundamental issues in linking monetary flows with the real economy is the issue of profit – the excess of firms' revenue over their costs. In the era of corporations with widely dispersed ownership, the term profits is not necessarily a helpful one. It requires careful definition. Dividends are paid out as part of a 'quasi-contractual' obligation to the household sector, at the discretion of the executive of firms. Their macroeconomic importance is in terms of distribution, not activity level. What is left as 'retained earnings' represents the firms' discretionary cash flow for investment and growth of the national productive base (Eichner 1987, p545). It is this discretionary fund that we are mainly interested in for the economic analysis of the firms sector.

'Profits' play an important role in the firms sector of the economy. They are generally regarded as the barometer of a successful and socially useful business.

[13] To avoid complication we have not in this diagram accounted for the fact that some production must have taken place, and therefore households employed by the firm have also received deposit transfers. This causes no additional problems as long as all wage payment is not made instantaneously.

Presumably this is partly a view of the ability of the firm to produce desired output. Economically the importance of profits is that they allow firms a certain discretion in their future path. The additional resources acquired allow the firm to choose and purchase capital goods to enhance its future production as it sees fit. Assuming a knowledge advantage of the firm as it operates day-to-day in its own market, this should represent an efficient use of society's scarce resources. There is a conflict here with the strict neoclassical view that all resources excess to immediate consumption needs are available on a perfect 'capital market' ensuring their direction to where they will produce the greatest return. In this case, the retained earnings part of corporate profits would be of no significance as the direct use of saved financial capital would have a direct cost exactly equal to the opportunity cost of using retained earnings. This assumption allows neoclassical models to assume an identity between the savings of households and the economy's capital resources for investment and growth. This is an assumption with uncertain theoretical foundation:

> … [W]hat is being talked about is not a market for capital – the term connotes the set of markets in which investment goods industry sell their output – but rather a market for capital funds, or long-term credit….Once one begins to think in terms of a capital funds market rather than a 'capital market,' one must recognise that what firms must pay to obtain funds through that market is not the same as the return that can be earned by supplying it with funds. (Eichner 1987, p495)

This difference between the cost of finance and its return is because the established firm can earn quasi-rents from its intimate knowledge of its own technology and market position.

The automatic equation of household saving with the source of investment in firms' capital base in neoclassical models would appear to derive from the traditional picture of the sole trader whose income from his trading or manufacture is the excess of revenue over costs, and so in this sense is the same as his 'profits'. Any expenditure

from this income devoted to building up his business would be directly at the expense of his potential income, and so it is quite correct that for such traders as a whole, their level of investment in their business is dependent on their saving. Even in this case unconsumed income might be held as gold in vaults rather than being invested in the business, so it cannot be said that saving and investment are equal in any finite time period.

In modern economies, with a clear distinction between the corporate and wage-earner sectors, the saving of wage-earners diminishes current consumption without leading automatically to increased physical capital. The holding of deposits may, at the margin, allow the issue of more loans by banks if they are short of reserves, but the deposits themselves cannot be used by the corporate sector. Other destinations for household saving include; government securities, where the money simply goes to reduce the deficit between government spending and taxation with no impact on productive capital; and the purchase of corporate bonds and shares which occurs mainly in secondary markets so that only the initial purchase price is available to firms.[14] According to monetary circuit theorists the main part of the motivation for the issue of corporate securities is actually to make up for the shortfall in loan repayment left by the holding of deposits by wage-earners. Funding of new investment for firms is mainly from retained profits.

3.6.1 Profits in a Monetary Theory of Production

If our balance sheet view of the monetary economy is the correct one, then we are faced with a puzzle in explaining the ability of firms in aggregate to earn profits. In the model of monetary flows described up to now, the most in monetary receipts that

[14] Although functioning bond and stock markets are of benefit to firms in that they enable efficient trading of such securities and so may raise the value of new issues.

any firm or aggregation of firms can earn in any production period or complete set of production periods is that quantity which they have borrowed and subsequently expended on wages and/or capital goods. It seems that under these circumstances the firm cannot earn a monetary surplus. But does the inability to earn a monetary surplus also imply the inability to earn a profit?

> Firms employ workers and pay them money wages. In spending their money wages, workers gain access to a fraction of the output, the size of that fraction varying according to the price they pay for goods in markets. Symmetrically, firms earn profits formed by the surplus of the price received for the goods sold over the wage-bill the firms paid out, allowing them and their backers to appropriate the complementary part of the output (Gnos 2005, p2).

In fact many proponents of the monetary circuit approach treat profit as additional real wealth acquired by firms, and it is not clear that this implies a monetary surplus.

> If we consider firms as a whole, their only external purchase is labour force. All other exchanges being external transactions, no further monetary payment is required. Only at the end of the production process firms buy capital goods to be used in the following period (Graziani 1989, p4).

Any addition to real wealth for a firm must involve pricing labour and capital inputs at lower than its output.[15] It does not necessarily follow that these price differentials are without the consent of wage-earners and capital goods suppliers. If they want to reap the social benefits of entrepreneurship and the risk-bearing services of the banks, then they have to accept the diversion of some part of output to reward at least the opportunity costs of those providing them. In this case the portion of real output retained by firms (or their owners) and banks is simply the economic profit required to keep them operating.

[15] There is thus the necessity for the firms sector as a whole to enjoy market power.

This leaves open the question of how it is possible for firms to purchase capital goods for money (as happens in a modern monetary economy). It can only be possible if there are both goods that are produced by the labour of wage-earners but not purchased by them, and firms have access to money to purchase them with. The pricing of goods above their wage costs (mark-up pricing) or the holding of money in the form of deposits by wage-earners will result in the first of these conditions, but not the second, since this money does not return to firms. To obtain the money to purchase goods additional to those purchased by consumers, firms must apparently undertake further borrowing without having repaid their original loan in full; a situation that if repeated will result in ever-increasing debt levels for firms.

Following from the assumption that the only expenditure of firms in aggregate is wages, and following the model of Kalecki in which consumption is determined as a residual of firms' investment (capital goods purchases) decisions, Graziani regards as the profit of firms the value of capital goods obtained in the way described above.

> [The] basic assumption [of neoclassical theory is] of an economic equilibrium determined by individual choices, with the consequent acceptance of the principle of consumers' sovereignty. In the circuit approach it is rather producers' sovereignty which prevails. (Graziani 1989, p13)

In an economy where only firms can borrow, any money received by firms must have been borrowed by firms. Thus in any period that includes both the issue and repayment of the loans that give rise to all money used in transactions considered, nominal expenditure must equal nominal receipts. Under these assumptions it is therefore not possible for firms as a whole to make a monetary surplus.

Yet capital is required to increase future output and is purchased from capital goods firms. Because of the nature of capital goods and the long-term consequences of their purchase they are undertaken in quite a different way from the purchase of labour

and intermediate goods. These goods are characterised by their long planning phase, production to order, indivisibility (there is no point in building part of a new factory) and the fact that their purchase is funded for the most part from retained profits. Thus we can make the alternative assumption that their purchase is not part of the cycle in which their funding is obtained, and so retained profits are seen as a monetary surplus at the end of the current production cycle.

The picture is complicated by the fact that capital goods firms too wish to expand, and indeed they must do if the growth rate of the consumer goods sector and the economy is to increase. So, in this case, capital goods firms *too* must accumulate a monetary surplus. What are the possible solutions?

3.6.2 The Overlapping Time-periods Explanation of Profits

Gnos rejects the Kaleckian explanation of Graziani.

> One can rightly suppose that firms borrow money from the banks and spend in advance the profits they expect to make. But this is not sufficient to solve the problem under discussion: being anticipated, the formation of profits is not explained but presupposed. (Gnos 2003, p333)

His explanation of the profits of firms (both real and nominal) is that they can arise because production processes overlap each other, although he does allow the possibility that '…although profits are gained from sales firms can spend them in advance thanks to bank loans.' (Gnos 2003, p335) The implication must be that in the real world we can never go back to the beginning of each series of transactions, and so that at any arbitrary point in time we will find firms already in possession of funds from previous circuits over and above that which they require to pay their wage bill. But as we have already argued, it should be a test of any candidate theory of money that it is able to explain the coming into being of money, and we cannot do that for the money that appears as profits. A further objection to Gnos's explanation is that it cannot account

for how any given level of aggregate profits can increase over any observed period. In fact the only way they can do so if they are the only recipients of bank loans is to borrow the funds they require to purchase capital goods from other firms.

3.6.3 The Graziani Model of Profits

Graziani (1989, 2003) insists on a clear distinction between the *financing of production* and the *financing of investment.* Firms' initial finance for production must cover all the labour *and* capital costs of their plans, whether their production is of consumer or capital goods. Once all payments have been made this finance returns to firms via the commodity or financial markets and so is destroyed as firms repay their initial debt to the banks. As it returns this money is transformed into the 'final finance' that allows firms to repay their debts, irrespective as to whether the final finance has been obtained from the sale of commodities or of securities.

Investment is only financed by the sale of newly produced capital goods. This can occur in two ways: either by the direct exchange of capital goods among firms, which they purchase with their production profits; or indirectly by the sale of securities to savers on the financial market. In this way investment always finds its final finance in saving.

The resulting distribution of income is based on the 'Keynes-Kalecki' principle, by which firms are monopolists in the market for consumer goods. As a consequence they can set their own profit margin and determine the distribution of income between wages and profits. Prices of consumer goods are set at the level that ensures that the quantity of these goods demanded are equal to the amount firms wish to produce and sell. While wage earners can spend no more in aggregate than the total wage bill, the expenditure of firms is only limited by the amount of bank credit they can obtain. We must adopt a model of the firms sector in which rather than viewing it as an integrated

entity, there are multiple firms exchanging capital goods among themselves. Wage earners do not consume all of their income but save some of their income in the form of securities.

Graziani states his assumptions as follows:

> If we consider firms as a whole, their only external purchase is labour force. All other exchanges being internal transactions, no further monetary payment is required. Only at the end of the production process firms buy capital goods to be used in the following period. (Graziani 1989, p4)

This 'wage postulate' we assume to be partially true in the sense that we can regard the consumer goods and intermediate goods sectors as an integrated unit where with in the production cycle all costs end up as wages for workers within the combined sector. If only the money used to pay the wage-bill is considered, any monetary loss incurred by a single firm must be balanced by an identical profit earned by some other firm. Thus firms as a whole don't make losses or profits.

Graziani (2003) describes his model in formal terms as follows. There is a single product used both for consumption and as the capital used in production. Aggregate supply is given by

$$X = \pi N , \tag{3.1}$$

where X is the total production output of both consumption and capital goods, π is the average productivity of labour and N is total employment. Aggregate real demand Y is given by

$$Y = C + I , \tag{3.2}$$

where C is aggregate real consumption of wage-earners, and I is aggregate real investment. Since

$$C = c(wN + iB) , \tag{3.3}$$

where c is the propensity to consume of wage earners, w the money wage rate, i the percentage yield on securities (bonds and equities), and B the nominal amount outstanding of securities issued by firms; and I is given by

$$I = b\pi Np\,, \tag{3.4}$$

where b is the fraction of aggregate product firms decide to acquire as capital, and p is the market price of production.

Given an equilibrium between demand and supply,

$$\pi Np = c(wN + iB) + b\pi Np\,, \tag{3.5}$$

this equation can be rearranged to give the equilibrium price

$$p = \frac{c}{1-b}\left[\frac{w}{\pi} + \frac{iB}{\pi N}\right]. \tag{3.6}$$

Since the term in square brackets represents the total monetary cost of production (wages plus interest costs per unit of product), the factor $c/(1-b)$ represents the ratio of receipts to expenditure. This shows how, by having the power to set the price of goods, the firms sector as a whole can acquire for itself a proportion of output. Profits are thus totally independent of the abilities or performance of entrepreneurs. Profits are only due to the fact that firms as buyers with unlimited purchasing power are able to acquire the share of real product satisfying their production and investment plans. This shows that money prices do not depend on the quantity of money, but on the propensities to save and invest and on the level of money costs (wages and interest on securities) (Graziani 2003).

The average real income of wage-earners is

$$\frac{1-b}{c}\pi\,, \tag{3.7}$$

and real consumption is

$$(1-b)\pi\,. \tag{3.8}$$

Thus both depend on the average productivity of labour and the share of total output firms wish to acquire for their own use (investment).

The rate of return on expenditure *r* is given by the ratio of the monetary surplus to the monetary cost of production:

$$\begin{aligned} r &= \frac{\pi Np - (wN + iB)}{wN + iB} \\ \Rightarrow r &= \frac{(c-1)(wN + iB) + b\pi Np}{wN + iB}\,. \\ \Rightarrow r &= \frac{c}{1-b} - 1 = \frac{b-s}{1-b} \end{aligned} \tag{3.9}$$

So we see how this depends on the level of money prices, but not on the interest rate for securities. As the firms aim to extract more output their rate of return increases. Thus the limit to firms' rate of return is not an economic one, but a socio-political one of how much they can enforce a lowering of workers' real wage and consumption.

For the vast majority of firms, the acquisition of a portion of their own output is of no benefit in increasing their own future output. Not only do firms generally need to exchange these 'surplus' goods with other firms for the most part the goods they wish to acquire themselves are of a particular nature. These 'capital goods' are manufactured for the most part by a particular sector of firms; the 'capital goods' sector. Parguez (2004, pp 264-266) accounts for the acquisition of capital goods by the firms sector similarly to Graziani, although he gives more emphasis to the role of banks in insisting on a particular real rate of return that the firms must adhere to this follows from the nature of firms, which exist to grow capital, and thus must make money profits. Firms borrow from the banks in two tranches or 'rounds'; one for the payment of wages which workers can exchange for a pre-determined output of consumption goods, thus allowing the firms to extinguish this debt, and one for the purchase of additional output

of capital goods by the firms themselves. This allows capital goods firms to repay their debt, and leaves firms holding an additional amount of real wealth in the form of new capital goods.

Borrowing for Investment

Most circuitist writers do take the view that capital goods too are purchased with borrowed funds.

> In order to buy finished goods, firms need finance as much as they need finance for paying the wage bill in the labour market.' (Graziani 2003, p99)

Once the capital goods purchases are made, loans can be repaid by the sector as a whole. This is the source of firms 'purchasing power which is in principle unlimited.' (Graziani 2003, p100). Aggregate profits are predetermined by investment expenditures, and firms as a whole receive as profits the amount of money all of them have individually borrowed from banks as credit to carry out their bids on the future as they are embodied in their acquisition of equipment goods (Parguez 1996). The nature of the payment system in a modern monetary economy requires that initial bank finance must go toward the purchases of all types of production, both of consumption and of capital goods (Seccareccia 1996). The discrepancy between the consumer and capital goods sectors in their ability to earn a monetary surplus in the circuit means that

> The only satisfactory solution must be one in which bank loans to firms are extended so as to include the money profits to be realised in *both* sectors. (Seccareccia 1996, p407) (Our italics.)

3.6.4 The Statistical Evidence for a Monetary Surplus

There is a variety of empirical evidence that confirms that internally-generated monetary surplus is of prime importance for firms' investment. First we must examine how such surplus is calculated. For the UK national accounts, gross operating surplus

for the non-financial corporate sector is derived by adding subsidies received and subtracting the compensation of employees and taxes payable on production from value added by the sector.[16] Since it is clear that subsidies, employees' compensation, taxes and property income involve monetary transfers, we can restrict further analysis to the elements of value added. Value added is determined in the national accounts by subtracting the value of intermediate consumption from output. Since the value of intermediate consumption is determined from annual purchases inquiries we can see this too is a monetary transfer. Output includes sales of own production, changes in inventories and work in progress, output not sold on the market[17] and output retained by firms for their own final use. It is only in the latter three categories that any doubt arises as to whether monetary transfers have taken place. In the case of inventories, the national accounts specifically exclude gains from appreciating prices of inventories by calculating their value not on historic cost, but on replacement cost at the time they are used or sold. Thus we are left with the conclusion that only within the categories of output not sold on the market and output for own final use will we find 'profits' of firms that are not matched by monetary transfers.

We also find that in the UK and the US, total discretionary wealth frequently exceeds total spending on investment. For 2004 the internal funds[18] of US non-farm, non-financial corporations amounted to $940.9 billion, whereas capital expenditures were only $861.0 billion.[19] For the same year the gross disposable income[20] for the UK

[16] According to *UK National Accounts Concepts, Sources and Methods* (Office for National Statistics 1998).
[17] Includes sales to units within the same enterprise and payments to employees in kind.
[18] Profits + capital consumption allowance – taxes and dividends
[19] *Federal Reserve Board 2005, Z1 release, table F102*
[20] Gross operating surplus + property income – interest, dividends, taxes and transfers

private non-financial corporations sector was £123.8 billion, but gross fixed capital formation only £100.3 billion.[21]

In 2003, the most recent year for which these figures are available, market output for the UK economy was £1,723.6 million (84% of total output), output for own final use £79.3 million (4% of total output and mainly produced by the household sector) and other non-market output calculated at £259.0 million (13% of total output and mainly produced by the government sector). The nature of non-market output means that for corporations it is more or less matched by costs that are subtracted from profits, but own final use must be balanced by an entry for fixed capital formation as corporations have no final consumption. Thus if we subtract output for final use from gross disposable incomes for non-financial corporations we have a measure of their monetary surplus. For 2003 this gives a monetary surplus of £108.1 billion. We are left with the conclusion that the *non-financial* corporate sector, at any rate, does indeed realise a monetary surplus at some time *before* purchases of capital goods are made in each period, which means that the funds to do so may have been held over from the previous period or may circulate more than once. This is not to say that the total monetary surplus of any period is necessarily held in money form at any time.

Moreover, it is an empirical fact (Corbett and Jenkinson 1997) that firms do not generally spend their profits in the same period as they acquire them, and they may indeed accumulate funds for several periods before making a major investment.

3.6.5 The Dual Circulation Explanation

The best explanation of monetary profit is that money is recycled to be spent on capital goods in the period between its receipt by firms and its use by the latter to pay

[21] *National Statistics 2005, National Accounts, tables K1 and K2*

off their debt to the banks. In theory this is possible, because any money spent by firms on goods purchased from other firms returns to the firms sector via wages of the employees of capital goods firms and so is available to repay debts. This a similar solution to that of interest payments. In the real economy, however, there is bound to be a delay in the return to firms of the money they have spent on capital goods, and so in effect they are extending the period of their bank borrowing – which is precisely equivalent to taking out a new loan of the same quantity.

If we follow Parguez (2004), Renaud (2000), Seccareccia (1996) and Nell (2004) and divide firms into consumer goods and capital goods firms, then it is possible to account for the profits of consumer goods firms from the wage bill of capital goods firms. We can show this formally as follows. If the money borrowed by the consumer sector is M_c and this is equal to the wages of the consumer sector W_c, then assuming no saving on the part of wage-earners, then the total receipts of the consumer sector are $W_c + \pi_c^m$, where π_c^m is the monetary surplus earned by the consumer goods sector. The capital goods sector borrows M_l, and pays this out in wages W_l. Again assuming no saving, these wages are spent on consumer goods, thus forming part of receipts for the consumer goods firms. Thus

$$W_c + \pi_c = W_c + W_l, \tag{3.10}$$

and so

$$\pi_c = W_l. \tag{3.11}$$

This can account for the profits of the consumer sector in theory, although there remains an issue of timing; given the nature of capital goods as described above, how can capital goods firms start their production process *before* the consumer goods sector has realised a monetary surplus? The profits of the capital goods sector remain in any

case completely unaccounted for. If consumer goods firms' profits π_c are spent on capital goods then it is clear that the capital goods firms can repay their borrowed wage bill.

To understand the role played by lending or a flow of money from a particular source, we must understand that we are dealing with a monetary economy i.e.: an economy where virtually all transactions of significance are carried out using money, and so for those transactions to take place money must be in the hands of the purchaser of a real good *immediately preceding* that purchase. This only makes sense if transactions are considered sequentially in the way that the monetary circuit approach does. The real economy consists of overlapping transactions and circuits which have started at different times, so it may seem unhelpful to isolate individual circuits. But unless we do this it is difficult to analyse how the flow of money – where it comes form and where it goes - affects the economy.

> An account of why money is held does not explain how money is used. An account of the demand by individual agents for (real) cash balances (the average demand over a period) tells us nothing about the sources and destinations of inflows or about their regularity. The approach assumes that balances are attributable to individual decisions, based on preferences, and does not consider the way agents interact with each other as they carry out their duties according to their institutional roles. (Nell 2004, p174-5)

In particular, the problem of accounting for the flow of a particular sum of money arises each time there is an *increase* in the firm's financial input that is converted into an additional profit. While we can account for a greater than one for one productive increase by a firm's position on an increasing returns portion of its production function, no such explanation can suffice to account for an incremental increase in monetary profit.

Nell explains the two-sector solution as follows. The first sector is that of the equipment sector, the second that of the consumer sector. This recognizes that ultimately, the overwhelming expense of the productive sector as a whole is spent on labour; even that of the mining and extractive sector. In the case of two sectors, it can be postulated that the consumer goods sector earns its profits in the form of the wages paid to the employees of the equipment sector, since these must be paid to the consumer sector to acquire the means of support. Thus the consumer sector borrows to pay its wage bill, but can pay for its supply of equipment goods with the money received in payment from the workers of the equipment goods sector. The problem is thus solved arithmetically, since the initial finance borrowed by the capital goods sector to pay its wage bill passes through both sectors before returning to the equipment goods sector to allow it to repay its debt. Even this leaves the equipment goods sector without profit, so that no increase in the production of equipment can take place. The solution to the problem is that the capital goods sector is further subdivided so that each subdivision provides the profit for another until we reach the machine tools sector (Nell 2004).

A problem with this approach may be that in the real economy it is sometimes difficult to distinguish ‘capital goods’ and ‘consumer goods’ firms. Construction firms may build dwelling houses and factories; food manufacturers may supply supermarkets and plant canteens. Because of this the sequence of production is not as clear-cut as Nell suggests. Because of this we cannot be sure that money can always complete the double (or greater) circulation necessary to ensure that the consumer goods firms have their monetary surplus when their wage-bill loans come due. Thirdly Nell’s conception of the machine tools sector that ‘makes its own capital goods’ seems somewhat far-fetched. It is unlikely that machine tools firms actually build their own factories! A

more plausible explanation is that consumer firms pay more than cost price to capital goods firms, so as to share the recycling of money across both consumer and capital goods sectors.

We illustrate the dual circulation solution to profit flows in **Figure 3.7**. At **Time 0**, a £100 loan has been paid to consumer goods firm F1, and a £10 loan to capital goods firm F2. A **Time 1**, it is assumed that the capital goods firm has paid out to its employees the full value of the loan. This shows up as an addition to the household deposits of Bank A. At **Time 2**, if Firm F1 has produced enough goods, then these households can purchase consumer goods transferring their deposits to those of Firm F1. At **Time 3**, Firm F1 uses this revenue to purchase capital goods when Firm F2 has finished their manufacture. At **Time 4** Firm F1 has completed its output and sold the rest to its own employees. This allows both firms to repay all of their loans at **Time 5**.

3.6.6 Other sources of cash surplus for firms

Firms may have a cash surplus that fluctuates irrespective of profit flows. Circuit theorists in general ignore borrowing for speculative purposes and borrowing for consumption (including housing consumption) by wage-earners (Fontana 2000). However as we argued in Chapter 1, there is a potential real gain from such borrowing, so that it can fit into the triangular relationship. Clearly the uncertainty involved in speculation and the long timescale and discounting effects in the case of consumption lending mean that the expected income to repay such loans is even more fragile than that for production loans. And when speculative loans are being used to purchase existing assets rather than new ones, there is a strong risk of speculative bubbles developing, as values spiral upwards (Dow 1993). We will come back to this issue in the context of expectational failure in Chapter 6. Speculative borrowing and consumption borrowing are also important because they provide a source of additional

money receipts for firms, increasing their chances of making a money surplus. Other possible sources are zero sum transfers, so that other firms have cash deficits and so have persisting debt or enter bankruptcy or foreign currency earnings.

3.7 Conclusion

In this chapter we have looked at theories of money that have explicitly linked production and the creation of money in a comprehensive view of the system of monetary stocks and flows. The Post-Keynesian (PK) school emphasises the role of money in dealing with historical time and the uncertainty of the real economy. Changes in real economic activity determine the demand for bank loans and this drives the creation of credit-money. The main focus of PK monetary analysis is on the relationship between commercial banks and the central bank. Money is 'endogenous' because the central bank must generally respond to requests for base money to back the lending of commercial banks. There is some sense that the issue of 'liquidity preference', and how agents adjust their monetary balances may sometimes be in tension with this view.

The Circulation Approach on the other hand, starts its analysis from a 'triangular relationship' between banks, firms and suppliers of labour and resources to firms for production. The banks issue credit-money as payment from the firms to their suppliers. It is then, very specifically, the sale of the firms' production for the money issued that allows firms to repay their debts and remain solvent. The analyses of deposit-holding and the role of the central bank are secondary to this 'circuit'.

Despite these different emphases, the PK and CA approaches are generally compatible in that they both see money creation as endogenous to the activity of the real economy and particularly to the production activity of firms. They both emphasise

the importance of money in relation to time and uncertainty as irremovable features of the real economy.

> [M]oney endogeneity…is part and parcel of the production process…credit precedes production, while money is created in the process of production, as the entrepreneur draws down his or her bank account to pay wages or to purchase other raw materials (Rochon 1999, p5).

Since initial finance generally comes from the creation of bank credit[22], which in turn is associated with the formation of bank deposits, the connection between production and money is established.

As long as banks are satisfied that they have an adequate probability of repayment and of receiving full interest payments (what is adequate will depend on their own profitability targets), they will issue loans on demand.

> [W]ith a contract in hand for delivery of goods in the future a business firm can obtain a loan…[The] advantage of relying on banks to provide business firms with working capital is that the amount of funds in circulation is a response to the level of economic activity' (Eichner 1989, p809-810).

Perhaps the most significant distinction between the two approaches lie in the stricter implicit definition of money in the CA. Since a bank is always involved in the triangular relationship, only banks can create money. There is also a difference in emphasis in terms of the interest rate. Whereas there is considerable Post-Keynesian emphasis on liquidity preference, the main focus of the CA analysis is on the interest rate charged by banks for loans (Graziani 2003).

In the rest of the chapter we analysed each aspect of monetary issues and flows using balance sheets, in which all financial elements consisted both of a liability and an asset, in contrast to the real asset of production. We showed how money issues and

[22] The initial finance (or a portion of it) for one firm in one circuit may have been saved from a previous circuit, but this is offset by the additional loan now required by the firm whose loan in that circuit created the money saved.

flows could at all times be matched by assets representing real production in progress or guarantees by the state.[23] The links this creates to the features of these real agents in the system were described in detail.

The issues of how monetary interest and profit flows can be accounted for in a system that respects of the monetary circuit were analysed and we showed that these could be consistently introduced as subsidiary monetary flows with in the aggregate circuit. The significance this has for income distribution was analysed according to the arguments of Graziani (2003) showing that by adjusting the sale price of their output firms can acquire a variable proportion of output. This analysis makes it clear that the limit to the acquisition by firms of a larger proportion of output by firms is not financial, but socioeconomic.

At the beginning of this chapter we asked in which direction causation runs between money and production. It seems that the path from production to money is at least as important as the opposite direction. While production might be feasible without initial finance, and thus without giving rise to bank deposits; the acceptance of money in its modern form could not exist without its link to production. In the following chapter we will go beyond questions about the acceptance of money to analyse its specific valuation. We have argued that money gets its *acceptability* from production, now we will argue that money gets its *valuation* from production.

[23] We will argue in the next chapter that these guarantees can be seen to represent a form of 'state production'.

Figure 3.1 Loan Issue

Time 0

Bank A

Liabilities		Assets	
Deposits (H)	0	Loans	0
Deposits (F)	0	B of E Deposits	0
Capital	0		
Total	0		0

Firm F

Liabilities		Assets	
Loans	0	Cash	0
Capital	0	Deposits (A)	0
		Production	0
Total	0		0

Time 1

Bank A

Liabilities		Assets	
Deposits (H)	0	Loans	100
Deposits (F)	100	B of E Deposits	0
Capital	0		
Total	100		100

Firm F

Liabilities		Assets	
Loans	100	Cash	0
Capital	0	Deposits (A)	100
		Production	0
Total	100		100

Time 2

Bank A

Liabilities		Assets	
Deposits (H)	100	Loans	100
Deposits (F)	0	B of E Deposits	0
Capital	0		
Total	100		100

Firm F

Liabilities		Assets	
Loans	100	Cash	0
Capital	0	Deposits (A)	0
		Production	(?)
Total	100		(?)

Figure 3.2 Loan Repayment

Time 0

Bank A

Liabilities		Assets	
Deposits (H)	100	Loans	100
Deposits (F)	0	B of E Deposits	0
Capital	0		
Total	100		100

Firm F

Liabilities		Assets	
Loans	100	Cash	0
Capital	0	Deposits (A)	0
		Production	(?)
Total	100		(?)

Time 1

Bank A

Liabilities		Assets	
Deposits (H)	0	Loans	100
Deposits (F)	100	B of E Deposits	0
Capital	0		
Total	100		100

Firm F

Liabilities		Assets	
Loans	100	Cash	0
Capital	0	Deposits (A)	100
		Production	0
Total	100		0

Time 2

Bank A

Liabilities		Assets	
Deposits (H)	0	Loans	0
Deposits (F)	0	B of E Deposits	0
Capital	0		
Total	0		0

Firm F

Liabilities		Assets	
Loans	0	Cash	0
Capital	0	Deposits (A)	0
		Production	0
Total	0		0

Figure 3.3 Deposit Holding and Bond Sale by Firms

Time 0

Bank A

Liabilities		Assets	
Deposits (H)	50	Loans	50
Deposits (F)	0	B of E Deposits	0
Capital	0		
Total	50		50

Firm F

Liabilities		Assets	
Loans	50	Cash	0
Bonds	0	Deposits (A)	0
Capital	0	Production	?
Total	50		?

Time 1

Bank A

Liabilities		Assets	
Deposits (H)	0	Loans	50
Deposits (F)	50	B of E Deposits	0
Capital	0		
Total	50		50

Firm F

Liabilities		Assets	
Loans	50	Cash	0
Bonds	50	Deposits (A)	50
Capital	0	Production	(?)
Total	100		(?)

Time 2

Bank A

Liabilities		Assets	
Deposits (H)	0	Loans	0
Deposits (F)	0	B of E Deposits	0
Capital	0		
Total	0		0

Firm F

Liabilities		Assets	
Loans	0	Cash	0
Bonds	50	Deposits (A)	0
Capital	0	Production	(?)
Total	50		(?)

Figure 3.4 Creation of Central Bank Money

Time 0

Bank A

Liabilities		Assets	
Deposits (H)	50	Loans	50
Deposits (F)	0	B of E Deposits	0
Capital	0		
Total	50		50

Firm F

Liabilities		Assets	
Loans	50	Cash	0
Capital	0	Deposits (A)	0
		Production	(?)
Total	50		(?)

Time 1

Bank A

Liabilities		Assets	
Deposits (H)	50	Loans	50
Deposits (F)	50	B of E Deposits	50
Capital	0		
Total	100		100

Firm F

Liabilities		Assets	
Loans	50	Cash	0
Capital	0	Deposits (A)	50
		Production	0
Total	50		50

Time 2

Bank A

Liabilities		Assets	
Deposits (H)	50	Loans	0
Deposits (F)	0	B of E Deposits	50
Capital	0		
Total	50		50

Firm F

Liabilities		Assets	
Loans	0	Cash	0
Capital	0	Deposits (A)	0
		Production	0
Total	0		0

Figure 3.5 Consequence of Loan Default

Time 0

Bank A

Liabilities		Assets	
Deposits (H)	50	Loans	50
Deposits (F)	0	B of E Deposits	60
Capital	60		
Total	110		110

Firm F

Liabilities		Assets	
Loans	50	Cash	0
Capital	0	Deposits (A)	0
		Production	(?)
Total	50		(?)

Time 1

Bank A

Liabilities		Assets	
Deposits (H)	50	Loans	0
Deposits (F)	0	Corporate Bonds	0
Capital	10	Treasury Bonds	60
		Equities	0
		Cash	0
		B of E Deposits	0
Total	60		60

Firm F

Liabilities		Assets	
Loans	~~50~~	Cash	0
Bonds	0	Deposits (A)	0
Capital	0	Production	(?)
Total	~~50~~		(?)

Figure 3.6 Interest Payment and Circulation

Time 0

Bank A

Liabilities		Assets	
Deposits (H)	0	Loans	100
Deposits (F)	100	B of E Deposits	0
Capital	0		
Total	100		100

Firm F

Liabilities		Assets	
Loans	100	Cash	0
Capital	0	Deposits (A)	100
		Production	0
Total	100		100

Time 1

Bank A

Liabilities		Assets	
Deposits (H)	10	Loans	100
Deposits (F)	90	B of E Deposits	0
Capital	0		
Total	100		100

Firm F

Liabilities		Assets	
Loans	100	Cash	0
Capital	0	Deposits (A)	90
Bonds	0	Production	(?)
Total	100		(?)

Time 2

Bank A

Liabilities		Assets	
Deposits (H)	0	Loans	100
Deposits (F)	100	B of E Deposits	0
Capital	0		
Total	100		100

Firm F

Liabilities		Assets	
Loans	100	Cash	0
Capital	0	Deposits (A)	100
Bonds	0	Production	(?)
Total	100		(?)

Figure 3.7 Profits

Time 0

Bank A

Liabilities		Assets	
Deposits (H)	0	Loans (F1)	100
Deposits (F1)	100	Loans (F2)	10
Deposits (F2)	10	B of E Deposits	0
Capital	0		
Total	110		110

Firm F1

Liabilities		Assets	
Loans	100	Cash	0
Capital	0	Deposits (A)	100
		Production	0
Total	100		100

Firm F2

Liabilities		Assets	
Loans	10	Cash	0
Capital	0	Deposits (A)	10
		Production	0
Total	10		10

Time 1

Bank A

Liabilities		Assets	
Deposits (H)	10	Loans (F1)	100
Deposits (F1)	0	Loans (F2)	10
Deposits (F2)	100	B of E Deposits	0
Capital	0		
Total	110		110

Firm F1

Liabilities		Assets	
Loans	100	Cash	0
Capital	0	Deposits (A)	100
		Production	(?)
Total	100		(?)

Firm F2

Liabilities		Assets	
Loans	10	Cash	0
Capital	0	Deposits (A)	0
		Production	(?)
Total	10		(?)

Time 2

Bank A

Liabilities		Assets	
Deposits (H)	0	Loans (F1)	100
Deposits (F1)	110	Loans (F2)	10
Deposits (F2)	0	B of E Deposits	0
Capital	0		
Total	110		110

Firm F1

Liabilities		Assets	
Loans	100	Cash	0
Capital	10	Deposits (A)	110
		Production	?
Total	110		(?)

Firm F2

Liabilities		Assets	
Loans	10	Cash	0
Capital	0	Deposits (A)	0
		Production	?
Total	10		(?)

Time 3

Bank A			
Liabilities		Assets	
Deposits (H)	100	Loans (F1)	100
Deposits (F1)	0	Loans (F2)	10
Deposits (F2)	0	B of E Deposits	0
Capital	0		
Total	110		110

Firm F1			
Liabilities		Assets	
Loans	100	Cash	0
Capital	0	Deposits (A)	0
		Production	(?)
Total	100		(?)

Firm F2			
Liabilities		Assets	
Loans	10	Cash	0
Capital	0	Deposits (A)	10
Total	10		10

Time 4

Bank A			
Liabilities		Assets	
Deposits (H)	0	Loans (F1)	100
Deposits (F1)	100	Loans (F2)	10
Deposits (F2)	10	B of E Deposits	0
Capital	0		
Total	110		110

Firm F1			
Liabilities		Assets	
Loans	100	Cash	0
Capital	0	Deposits (A)	100
Total	0		100

Firm F2			
Liabilities		Assets	
Loans	10	Cash	0
Capital	0	Deposits (A)	10
Total	10		10

Time 5

Bank A			
Liabilities		Assets	
Deposits (H)	0	Loans (F1)	0
Deposits (F1)	0	Loans (F2)	0
Deposits (F2)	0	B of E Deposits	0
Capital	0		
Total	0		0

Firm F1			
Liabilities		Assets	
Loans	0	Cash	0
Capital	0	Deposits (A)	0
Total	0		0

Firm F2			
Liabilities		Assets	
Loans	0	Cash	0
Capital	0	Deposits (A)	0
Total	0		0

Chapter 4. The Valuation of Money

4.1 Introduction

In the previous chapters we have described a monetary theory of production in which tokens of debt are accepted in a triangular contractual and institutional arrangement. This evolves to allow production to take place when this involves a time delay and thus a degree of uncertainty between the input of labour and/or capital goods and the availability of outputs. We have shown how these arrangements and their corollaries in the payment of monetary interest and the earning of monetary profits can have real consequences for the transfer of goods and services, while the tokens issued add no net value in themselves since financial assets are always matched by financial liabilities.

We pointed out, in terms of an equilibrium model in Chapter 2, and a balance-sheet approach in Chapter 3 that the acceptability of the debt token issued could be significantly increased if its circulation was enabled by some form of 'bundling' of debt tokens so that they were no longer dependent on the output of any particular firm. In other words their acceptability and circulation were enhanced because these tokens represented general purchasing power. This required either that all tokens be issued by a single commercial bank or that all banks were linked through a central bank by the use of a 'base' money, in which form commercial banks could net out discrepancies between inflows and outflows of each others' issued money.

Our balance sheet description was deficient however. For simplicity of illustration it only showed one bank and one firm. In this case, although we showed balance sheets using monetary values, we could equally well have used real outputs of the single firm. Thus we had no need to explain how the numerical value of money relates to quantities of real goods and services when this relationship must encompass all households, all firms, all banks and the state and central bank in a modern economy. This omission we now intend to rectify.

We will argue that convention and legal tender laws are not adequate to explain the particular value that a money holds, and use the arguments of the 'Real Bills' debate to support our contention that real physical value is the most appropriate measure of the value of money. We will briefly examine an unusual view of money's valuation, owing to Heinsohn and Steiger (2006), that suggests that the value of money is backed by 'burdened' pre-existing property. We reject the idea that this is of importance in valuing money, primarily because it does not explain how new production is valued. We also reject the 'Chartalist' view that money's value is always given by the state's demand for it as taxation, because this is to confuse acceptability with valuation. In any case, this doesn't tally with the fact that such a small proportion of money in a modern economy is state-issued. Our argument is that the true valuation of money is to be found in the creation of a money of account in the triangular production contract.

4.2 'Fiat' Money

> 'Fiat money' is an object that has no intrinsic value and is not convertible into anything. Acceptance of such money is entirely discretionary and based exclusively on the expectation that others would accept it too even although no one else is forced to accept it (Goldberg 2005, p957).

The first task is to exclude the possibility that there is no such relationship; that money does no represent a true claim to anything of value. If this were so, then its value is based exclusively on the expectation that others would accept it for some quantity of goods. These others have no other basis for valuing it either and so on. We have argued against such a faith-based reason for the acceptance of money in Chapter 2 and it seems even more self-evident that the *valuation* of money falls at the same hurdles of failing to get started, and of failing to get restarted should any crisis of faith occur. That there have been such crises, and that money's valuation has been resurrected is evident. Examples would include Germany in the 1930s, Russia in the 1990s and Argentina in the 2000s.

As it turns out the claims of such money actually existing, even without the limited status of legal tender, are based on misapprehensions. Goldberg reviews the empirical evidence and convincingly shows that this can be discounted. He finds that all of the apparent examples given of such moneys had considerable physical, legal or cultural value. An example of this is the story of the Stone Money of Yap, which has been quoted by several economists, including Keynes (1971[1930]). Goldberg reports that the stones were unique and had been transported from distant islands, being found by the islanders to have a high aesthetic value as well as religious significance. They were also acceptable for tax payments to the island chiefs and the German colonial regime and for other special payments at wedding festivals and funerals (Goldberg 2005, p 960). There is also doubt about a famous story concerning a lost stone, the verbal claim to which was alleged to have retained purchasing power. Other apparent examples of 'fiat money', such as the wampum shells used by Native Americans, actually had some intrinsic valuation of the items used, or they were not in fact used as media of exchange (Goldberg 2005).

Whereas Goldberg argues that fiat money *has not* existed, Sproul (1998) argues that fiat money *cannot* exist since the whole value of fiat money is seignorage, and seniorage must always be driven to zero as rival bankers compete away the profits they make from issuing credits. To be valued, fiat money must be limited in supply. But if there is a benefit to issuing money in terms of seniorage this must be competed away by rival private banks.

4.2.1 Legal Tender

It has been suggested that 'legal tender' laws ensure that money is accepted, but legal tender laws in modern democracies apply only to contracts that have been previously specified in the relevant currency.

> All Federal Reserve notes and US coins are legal tender for all dollar-denominated obligations, including debts and taxes. This means that contractual creditors, all tax authorities and all courts (federal, state and local) cannot reject a payment made in these objects. Almost all banks (national banks and members of the Federal Reserve system) must accept all Federal Reserve notes in all transactions. Anyone else can reject these notes and coins in any other transaction (Goldberg 2008a, p33).

This implies that were there to be any doubt about the acceptability and value of this currency, it is unlikely that such a contract would exist in the first place.

4.3 'Real Bills'

A strong series of arguments supporting our contention that production must be the source of valuation is to be found in the debate over the importance of real bills in maintaining the value of money. These arguments are often displayed against the quantity theory. The 'real bills doctrine' (RBD) holds that money issued in exchange for sufficient security (traditionally short-term commercial bills, but in general any reasonably secure financial asset) will not cause inflation (Sproul 1998). The issue is

whether it is simply the absolute quantity of money in the economy that is important, or whether it is the relationship between money issue and the creation of 'real bills', that determines the behaviour of the real economy. Under the RBD, if the issue of credit-money is backed by such assets then the value of money is not affected. In opposition to this, the quantity theory suggests that an increase in the quantity of money is always likely to be inflationary, unless matched by an equivalent overall increase in economic activity.

This raises the following questions:

> Why does the Federal Reserve (and every other central bank) bother to hold gold and financial securities if the dollar (and other currencies) does not get its value from backing? How could fiat money ever come into circulation in the first place? Why issue dollars through an expensive central bank instead of just printing them and spending them? (Sproul 1998, p9).

The answer is that it is this backing that gives money its acceptability and valuation, and that without considering this, the quantity of money on its own tells us nothing. The acceptability and value of derivative monies depend in turn on their own backing rather than on absolute convertibility. No money can be issued without backing, and the value of money issued by banks depends only on its ratio of assets to liabilities (Sproul 1998). While so-called 'fiat' money is inconvertible into gold or other real assets it is in fact nonetheless backed.

> Economists have been too quick to accept the idea that what we call 'fiat money' is actually unbacked, since it is possible for money to be inconvertible yet still backed (Sproul 1998, p2).

Central banks (and presumably commercial banks also) hold assets against the money they issue and no money is ever issued except in exchange for valuable assets.

To illustrate the importance of backing over convertibility Sproul (1998) describes a bank that has issued 100 credits (each equivalent to 1oz. of gold) after taking 100oz of gold on deposit. He claims that if this bank then issued 100 credits in exchange for IOUs with a current market rate of 100oz of gold, since there are now 200 credits with a claim to assets worth 200oz of gold each credit is still worth 1oz. of gold – and this process could continue indefinitely without altering the value of the issued credits - as long as credits are only issued to those who offer resources with the appropriate value. Thus if we have a £100,000 deposit with the Royal Bank of Scotland, it is backed by assets that the bank holds; for example: commercial paper, loan portfolios, foreign currency, central bank reserves and cash. But we cannot go to the Royal Bank of Scotland and demand that they convert our deposit into any of these assets automatically, except for intrinsically worthless banknotes.

While all this is true, there must surely be some sort of indirect convertibility across the balance sheet. There must be some connection between what is providing the backing for money and what money is ultimately convertible into. In Sproul's example it seems that a credit for gold does not have exactly equal value to gold itself unless either:

1. Gold can be obtained from the bank issuing the credit at any time; or
2. Gold can be obtained from some other source on presentation of the credit.

Gold is a real substance and its demand depends (at least in part) on individuals' demand for its intrinsic qualities. This distinguishes it from circulating credits for gold that cannot be converted into it. Given a balance between those that value gold for its intrinsic properties, and those that value it only in exchange it may be that these credits

have some average value, but this average value will not hold at all times. Prices denominated in these credits may vary from transaction to transaction since they are not money prices, but are relative prices between gold and the goods and services exchanged.

Another issue to be considered when looking at the pure 'Real Bills' doctrine is that the securities backing money issue have to be claims that are going to be exercised in a relevant time-frame, such that it is a realistic option for holders of money to purchase what it is a claim on. This is particularly relevant when we consider household and speculative lending. In the former case, when money is issued it is ultimately on the basis of a claim on future household labour; in the latter case it is a claim on some asset that is expected to have a greater real value in the future than it does now. Neither of these claims are exercisable within the normal transactions of households and firms, so unless there is a matching increase in deposit holding, inflation may well be the result.

Apart from these caveats, there are two main lines of argument that have been used against the RBD. One is a historical argument based on its purported role in propagating the effects of the Great Depression; the other that it leads to dynamic instability of prices.

4.3.1 The Real Bills Doctrine and the Great Depression

Timberlake (2007) believes that the adherence of the leadership of the Federal Reserve to the RBD between 1929 and 1933 led to at least some of the problems of the Great Depression, as the negative aspects of this doctrine led to the discouragement of money issued on the basis of the long term loans, mortgages, government bonds and, in particular, speculative loans. It seems that this unwillingness to extend credits spread from speculative lending to what would normally be considered as eligible real bills. It

is claimed that it was this reluctance rather than adherence to the gold standard[1] that was responsible for the 'Great Contraction' of 1930. But can a gold standard really be a final arbiter of monetary value?

The Role of a Gold Standard

Bernanke (1995) summarises a monetary gold standard using the following equation:

$$M1 = (M1/BASE) \times (BASE/RES) \times (RES/GOLD) \times PGOLD \times QGOLD\,, \qquad (4.1)$$

where M1 = Quantity of Bank Deposits and Currency in circulation,

BASE = Quantity of Currency and Reserve Deposits,

RES = Central Bank Reserves of Foreign Currency and Gold,

GOLD = Official Value of Gold Reserves of Central Bank,

PGOLD = Official Legally-Fixed domestic-currency price of gold,

QGOLD = Physical Quantity of Fine Gold in Central Bank Vaults.

The M1/BASE ratio is the Money Multiplier, which is a decreasing function of the currency-deposit ratio chosen by the public and the reserve-deposit ratio chosen by commercial banks. This ratio was around four in the Great Depression era, and is in the modern era usually greater than 20. The BASE/RES ratio is the inverse of the gold backing ratio, which has usually been set as a statutory maximum. It was usually greater than one because central banks could also hold domestic assets against base money. RES/GOLD is the ratio of international reserves to gold. Foreign exchange (convertible into gold with foreign central banks) is also counted as reserves, so this

[1] The gold standard has been indicted as a major cause of the Great Contraction by Bernanke (1995) and Eichengreen (1992), among others.

ratio is also greater then one. This analysis makes it clear that the gold standard has never implied 100% gold backing for money in circulation.

Bernanke argues that the effect of the gold standard is in fact mediated through demand for currency by domestic money-holders and by foreign-exchange requirements as goods are imported from abroad. Fears of bank default and devaluation of currencies lead to falls in the M1/BASE and RES/GOLD ratios as individuals demand more secure assets. A gold standard in this situation is actually compatible with multiple values of the money supply, depending in the level of confidence in the banking and foreign exchange systems.

Something like a 'Real Bills' regime, would in this case give some guidance to how the central bank and the commercial banks should expand BASE/RES and M1/BASE respectively where appropriate loans/commercial securities can be obtained. Timberlake's point is that a gold standard and a prudent BASE/RES ratio places downward/upward limits to the reserves commercial banks wish to hold and so corrects excessive/inadequate lending. Sproul denies that this is required to prevent loans secured by a given money value of assets creating a self-perpetuating cycle of more money and more inflation. He argues that the initial issue of money, if on sufficient security, would not cause inflation. He may however have overlooked the possibility that fluctuations in the value of assets may arise from other than monetary sources, of which more in Chapter 6.

Historical episodes of inflation attributed to the real bills principle are in fact usually due to the unconstrained monetisation of government debt (i.e.: the creation of money by the central bank in exchange for its holding of Treasury Bills). In the 1929-32 period the Federal Reserve Board (FRB) did not conform to the RBD because it frequently refused to discount any bills from banks, real or otherwise. This was

probably an overreaction to the previous years in which the FRB violated the RBD in the opposite direction by discounting not just real bills but government debt also (Hortland 2006).

Dynamic Instability of the Real Bills Doctrine

Timberlake (2007) argues that if the basis for the creation of money were currency-denominated assets on the other side of the balance-sheet of banks then instability would be the result. Only gold (or some other commodity with constant real value) can be used as a standard. This sets the number of pounds/dollars for a quantity of fine gold in constant legal terms, whereas monetisation of real bills cannot be done on fixed terms and so depends critically on the optimism or pessimism of bankers. Over-optimism results in too much money in relation to real value; excessive pessimism results in too little. The inflation or deflation that results affects the value of the 'real' collateral. If so the likelihood is that the value of the money issued against collateral will fall/rise further. This situation is thus dynamically unstable with prices moving up or down unchecked.

Timberlake's argument is that some sort of anchor, such as the gold standard must be present. In this case, if bankers are unduly pessimistic and issue 'too little money' in exchange for collateral then bankers' reserves of gold will be not be drawn upon and this will moderate their pessimism. In reverse, if bankers are excessively optimistic and issue 'too much money' in exchange for collateral then bankers' reserves of gold will fall, reducing their ability to lend

In fact, if more money enters circulation it is because more has been demanded to execute trades. Thus for the quantity equation $MV = PT$, both M and T have risen roughly proportionately, so as long as payment technology and thus velocity remains

unchanged *P* will be more or less constant. The dynamic instability critique, in that it has any viability, must then also apply to any system that has a degree of flexibility of money issue. The only monetary system to which it would not apply is one with a rigid, centrally controlled money.

From the discussion of the RBD we are left with the impression that something of physical value is the most likely source of money's value; that it need not be something that can immediately be brought to hand, but may be something that is promised if this can be given a reasonably reliable monetary value. In the next two sections we consider property and taxation in this role.

4.4 Burdening and Encumbering

The German economists Gunnar Heinsohn and Otto Steiger take the view that the creation of money is 'property-induced'. Money is created by the holders of property - in issuing it, their property is 'burdened' and so in some sense loses part of its value, this loss being compensated for by the payment of interest. It is this property that provides the reliable value backing money. The burdening of the property allows the 'creditor' who uses the notes in a credit transaction to back the note issue and their circulation as insurance against un-repaid loans.

> Money's capacity to finally settle contracts, i.e.: the transfer of property in sales or its redemption in dissolving credit is due to its being a claim to property of its issuer' (Heinsohn and Steiger 2006, p492).

If we refer back to our hostage model in Chapter 2, the banker's token is issued on the basis of the banker's ability to enforce the production contract between A and B by ensuring the acceptance of tokens for labour and subsequently for goods. Only if his enforcement powers are in doubt would he need to offer a claim on property

> The issuer's property titles together with the debtor's are the first to be denominated in the money of account, the standard set by the creditor (Heinsohn and Steiger 2006, p502).

Heinsohn and Steiger do not make it clear why the liabilities of a bank (deposits) are money, whereas the liabilities of firms and households (loans) are not, even although both are issued against property ('burdening' in the case of a bank and 'encumbering' in the case of the firm or household (Läufer 1998). This suggests that it is something other than property pledging that distinguishes between money and other financial liabilities.

4.5 Money and the State

An important argument for the acceptability and valuation of money is based on the role of the state. For Wray (2003) the state exerts its sovereignty by imposing a tax liability on the non-state sector and in this way it is different from any other agent that issues liabilities, because it uses its sovereign power to impose them. All modern states rely heavily on a monetary system, first imposing taxes to create a demand for the currency, then issuing the currency to buy desired resources. It is the sovereign power of governments that allows them to issue currency and reserves that are demanded domestically and abroad. Without the U.S. Treasury's sovereign power to impose dollar taxes the world demand for dollars would 'wither away'.

> In a nation that operates with a fiat money on a floating exchange rate, treasury debt is really nothing more than reserves that pay interest… This really cannot be called a borrowing operation – it makes no sense to argue that a government operating in such a system needs to 'borrow' its own liabilities in order to deficit spend (Wray 2003, p96).

Goldberg's (2008a, 2008b) conclusion too, is that it is the commitment of governments to accept in payment of taxes the currency they issue, that ensures its acceptability. However he also points out that there has to be a tax burden high enough and a collection system, with adequate penalties, efficient enough to match the quantity

of currency in circulation. These arguments do not directly address the issue of deposit money created by commercial banks. But since all "non-tangible" deposit money 'is convertible… into currency it is sufficient to discuss the legal status of currency… and convertibility' (Goldberg 2008b, p7).

4.5.1 The State as Producer

Wray does not accept that government is the producer of goods and services for which taxes are the payment, arguing instead that they are consistently very large net consumers of private sector output. He also argues that taxes are 'not voluntary at the individual level'. This leads him to the rather circular statement that

> In all modern states, one eliminates one's tax liability by delivering the state's own liability – what we have been calling fiat money – at state pay offices. Why does one accept the state's liability? Because one is indebted to the state as a result of imposition of tax liabilities, and the state agrees to accept its own liabilities in retirement of the tax liabilities it imposes as a result of its sovereignty (Wray 2003, p90).

In our view though, although the unit of account is named by the state with tax liabilities imposed in it and liabilities denominated in it, money as purchasing power for commodities produced in the non-state sector is valued as a result of the 'effort' involved in obtaining it, in the form of the labour services or commodities provided in exchange for it. For the individual, there is no distinction between state and bank money, so the effort required depends more on the 'effort' required in the non-state sector. Of course the tax burden increases as income increases, but it seems improbable that the value of money should change according to the tax burden.

Wray's view leads him to argue to argue that government deficits do not require the Treasury to borrow by selling new issue, but these only require the central bank and Treasury to drain excess reserves to avoid downward pressure on overnight interest rates. In the short run the central bank provides reserves through open market

purchases; in the long run the Treasury retires outstanding debt. Running a sustained deficit creates excess reserves, which for the banks are more profitably converted into interest-paying treasury debt. This means that there is little problem selling the debt when the treasury desires to do so. The U.S. government can also purchase goods from abroad 'for nothing' by issuing dollar reserves that eventually find their way into the central bank of the foreign country. He believes that this is also true when a sovereign state imposes a tax liability and then it issues the currency used by those of tax liabilities to meet the obligation (Wray 2003). But in fact demand for US goods, services and assets would persist – and these all require to be paid for in dollars.

In fact, if U.S. government purchases a good with money that it issues and does not use that good to increase its 'value" to the U.S. taxpayer various things may happen

1. The increased taxes with the same level of government services decreases satisfaction with this government in particular and government in general.

2. An increased quantity of money in the economy for the same quantity of new goods *ceteris paribus* reduces the value of money. If there is no change in taxation rates this may offset government expenditure.

3. The government issues bonds to mop up extra money, so has to pay interest on this.

So Wray's view is true only if the government provides value to match the increased government expenditure. There is no 'default risk' because such a government will always be able to pay interest and retire principal by crediting banking system reserves (Wray 2003, p96). Yet this is in potential contradiction with the importance of the relative quantity of the tax burden to currency, and it suggests that money is primarily a

creature of the state where the team production/hostage model suggests a plausible private origin, and support, and could thus survive a zero-tax regime. Moreover, it is clear that otherwise the value of money becomes tied up the efficiency of tax collection and the penalties applied, since even a government cannot pay for its purchase of goods and services by simply letting its own IOUs circulate within the economy. The purchasing power of any money it issues can only result from economic activity. There must be a mechanism that associates the numerical token with the real sector's production (Rossi 1999).

This view that the government must back its money with something of value is to some extent supported by Mehrling (2000), who argues that state money is not a fiat outside money as Wray's view would suggest, but an inside credit money that is a liability of the central bank. He accepts that the power to tax is important, but the extent to which governments may be able to expand their purchases with newly issued money depends on available 'unused taxing authority' arising from its legitimate authority passed to it from private civil society as part of the democratic process. Therefore the power to tax is not the source of money's value. Moreover, while the state borrows at the lowest rate interest, because it has the lowest risk of default, its debt must still compete with privately issued debt, to which a risk premium has been added. What is more important is that the state is the one entity with which every economic agent does 'ongoing business'. It is this, rather than the power to tax, that makes the government ideally placed to be the issuer of the ultimate domestic money (Mehrling 2000, p403). We would argue that more than simply ongoing business is required to give state money value; something of value must lie on the other side of the balance sheet from the central bank's money deposits.

We can identify the flaw in Wray's argument as being that he ignores the relationship between central bank money reserves and circulating commercial bank money. Wray seems to envisage that the government could make additional expenditure without providing additional value recognized by its tax payers. To the extent the government did not wish to or could not increase taxation on political grounds and/or to avoid inflation the government could issue additional government securities to mop up the excess reserves - but this would have an effect simply on the asset side of the banks' balance sheets, allowing them to exchange non-interest bearing central-bank money for interest bearing Treasury Bills, which they would of course willingly do. Yet there would be no change on the liability side of the balance sheets, the amount of deposits held by the public and firms would remain unchanged. To reduce the available purchasing power in the economy, the Treasury must sell securities directly to the public, almost certainly requiring an increased interest rate at a cost to the Treasury; so it would pay in this way.

While autocratic regimes may enforce the use of their own currency by coercion with legal tender laws and penalties for non-payment of taxes, regimes based on greater or lesser degrees of consent must also induce their citizens to use their currency by providing services demanded by them. In this sense state money is in part supported by state production.[2]

So none of legal tender laws, property encumbrance and taxation by the state appear to account for the valuation of money. We turn now to valuation that arises within the triangular production contract, essentially a generalisation of the 'Real Bills' concept to encompass any output for which a monetary value can be negotiated. This generalisation requires the introduction of the concept of a 'Money of Account'.

[2] In a modern multi-bank economy state money is also demanded because of its role in the settlement of interbank transfers.

4.6 Money of Account

4.6.1 Money of Account as 'logically anterior'

The triangular relationship that creates money endogenously to the production process can, unlike pure exchange processes, produce an abstract measure of value to which any specific media of exchange must conform to. This is argued by Keynes in the *Treatise on Money*.

> Money of account, namely that in which debts and prices and general purchasing power are expressed, is the primary concept of a theory of money', and such money 'comes into existence along with debts and price lists in the monetary theory of production (Keynes 1971[1930], p3).

Ingham (2004, 2006) builds on Keynes's arguments, stating that an abstract money of account must be logically anterior to money's specific forms and functions. Indeed it is where the 'quality of moneyness' is to be found, and this quality is to be 'a pure symbol of abstract value measured by its own scale' (Ingham 2006, p275). Money of account has no single empirical object as medium of exchange; currency, bank deposits, and banker's reserve deposits all fulfil this role in the modern monetary economy.

4.6.2 Money of Account in exchange

There is in fact no possibility that a multitude of barter exchanges driven by individual subjective preferences could produce an agreed set of single prices for all goods. The numeraire of money, supposedly arising in multilateral exchange, 'is simply posited as the arbitrary assignment of a commodity with an already established value as a standard' (Ingham 2004, p34). This false view of money arises from the neoclassical idea that money is a commodity and therefore accords to the rules of supply and demand; that its acquisition and disposal is determined by the marginal utility of

individuals and that there is a stock of money that circulates with a (theoretically) measurable velocity (Ingham 2004).

The exchange prices for commodities will in fact differ according to the preferences of individuals. While it is true that when some goods are regularly traded as intermediate goods rather than goods for final consumption and there will be a tendency for these to be valued according to some average of the expected exchange ratios for desired goods, this does not come close to a single fixed price in a standard unit. Since 100 goods could possibly yield 4,950 exchange rates, a genuine market in which demand and supply are equated must *presuppose* the existence of a money of account in which prices can be quoted (Ingham 2004).

The value of money is thus not derived directly from a commodity or commodity standard, but is a claim against goods and is abstract purchasing power. '[The] value of all money is its value as credit denominated in an abstract money of account' (Ingham 2004, p88). This credit is ultimately discharged by payment of the claim in consumer goods. This does not mean that the value of money can be reduced to the value of goods, in any except the equilibrium end-state of orthodox economic theory. In fact its value at any particular time must result only from a temporary balance of economic power.

Money is itself a social relation; that is to say, money is a claim or credit that is constituted by social relations. Regardless of form, money is a provisional promise to pay, and the possessor of money is owed goods. But money represents a claim or debt against the issuer, so must be capable of cancelling any debt against the issuer. An IOU in a bilateral transaction is not money because money as debt must be transferable and denominated in the abstract unit of account, and we have seen in Chapter 2 how the bundling of debt into generalised purchasing power makes this possible The origin of

the power of money is in the promise between the issuer and user of the money in an *enforceable* claim or credit. This enforceability requires an authority, which maintains the unit of account within its sphere of control (Ingham 2004, 2006).

4.6.3 Logic and History

There is a logical issue too, in teasing out the distinction between the money of account, and the objects that transmit actual value. Does the money of account as the measure of value have to be, itself, valuable? It seems common sense, perhaps, that it must. Yet the metre is not long (or short). Being an abstract idea, it has no dimensions. Neither do the pound sterling, the euro or the dollar as units of account have value in themselves. Only when they are units in the reckoning of a bundle of notes or a bank deposit, is there real value present because these can be exchanged for goods and services.[3]

The historical record suggests that money arose initially as 'money of account', before it became materialized into forms such as notes and coin, and that even then there was often divergence between the units in which prices and contracts were delineated and commodities by which debts were discharged (Tymoigne and Wray 2006, Ingham 2004). The authority backing all money issue, not just that issued by itself, by upholding debts contracted in the money of account, was usually *the* authority in the relevant geographical jurisdiction in the form of the local ruler. This might be expected. Power over the money of account of the region also gives the ability to acquire goods and services from the citizens at a return fair to the extent that protection, justice (including enforcement of contracts) and other services are provided by the state. How fair that return is depends on the prices offered by the state for the goods and services of its citizens in relation to the taxes it imposes in its currency.

[3] See the discussion in Ingham (2006).

4.6.4 Money of Account and the triangular contract

Single Firm Case

When the claim to goods that is money is issued, negotiations take place between the firm and the worker. Because the worker prefers to receive wages in the form of claims that are valid not just for his own firm's output but for that of other firms as well, the issuing firm must produce these claims in a way that allow the workers to be able to asses their value against all available output. The issuing firm is not directly concerned with how much of other firms' output they are issuing claims for, but they must anticipate the earnings of their own output. To break even the firm must pay out a nominal wage bill that it can anticipate receiving when it sells its output.

Why are the claims to firms' output not simply denominated in real goods (even if these are real goods yet to be produced)? Firstly, because general claims are more liquid, more acceptable and so have a lower cost for firms to issue (see section 2.4.3). Secondly, banks denominate loans in the money of account so as to determine what represents repayment of the loan, otherwise they would be faced with an endless list of quantitative claims which would have to take account of multiple different relative valuations of real goods. Since purchasing power is general, firms require value set against both inputs and output so that the firm can be sure that it can as a minimum repay its loan. This automatically provides a relative valuation of output and inputs and determines the firm's share of output (Graziani 2003).

For money valuations each transaction is one real good against a claim on an almost infinite number of other goods. It is impossible to see how an individual could calculate this. So what happens initially is that the bank issues a claim on goods in arbitrary units, but the price is set in advance so these arbitrary units represent a known quantity of real goods. When additional firms enter the monetary economy, it becomes

possible for workers to compare their wage numerically with that of others since they can claim other firms' output goods and other firms' workers can claim that of their firm.

Multi- Firm Case

When there are many firms the wage just becomes a number; there are so many possible purchase choices it can longer be directly compared with goods it can buy, but only with other wage numbers. This necessitates some form of price index to determine some 'real' value of money. How this price index is calculated introduces another layer of uncertainty into relative value calculations. The net effect is to put firms in charge; they can manipulate prices and wages (within limits) since there is always some uncertainty about what these prices really represent in terms of goods and labour.

Money of account is the abstract measure of value and can provide in itself all of the important attributes of money such as price and debt contracts. Included in the debts that are created in production are money wages, which as indicated by the 'hostage' model in chapter 2 are valued against the hours of labour supplied by the worker and the number of goods he/she expects to receive from his/her own firm and others in the future. Yet the 'hostage' is not a token representing first one and then the other, even although it could be denominated in one or the other. In fact the initial assignation of the monetary unit when it arises in this way is arbitrary but there must be some real value already involved for the acceptor of money in the contract to take part in the negotiations that give rise to it.

When all production contracts use the 'money of account' in which the 'hostage' is denoted then it is easier for each agent to calculate the value of the 'hostage' since only a single comparison with the price of each other good desired and

available for purchase is required instead of having to calculate its value in multiple barter ratios

There are other important differences as the system evolves. The single firm triangular contract must cover:

1. The quantity of money issued as wages/capital goods prices
2. The quantity of labour/capital goods supplied
3. The money price of output (and thus the real wage).

The multi-firm contract must consider the first two of these, but the last becomes of much less relevance since the purchasing power of the money wage is barely influenced by the price of a single firm's output among the output of many firms. So in a multi-firm and multi-commodity economy, the money of account hostage gives power to the firms to set their prices; workers must generally accept prices as given (which when only goods from their own firm or from very few firms are available, would be negotiated in a triangular contract.) This tends to mean that in response to any feelings of injustice on the part of workers there will be upward pressure on wages rather than downward pressure on prices.

4.6.5 Changes in Valuation Subsequent to the Triangular Contract

Any loan denominated in money is at risk of being devalued in real terms. The value of money is initially determined in the triangular contract, but frustrated expectations may alter this value unless output falls short by exactly that quantity of money agents wish to add to their deposits. Since a stock measure of money does not distinguish between deposits in the process of transfer and those that are not, the stock of money is generally meaningless as a guide to inflationary pressure.

The income velocity quantity equation:

$$MV = PY \tag{4.1}$$

confuses the issue by suggesting that an increase in velocity could produce inflation; that money circulating faster can raise the general price level. This would render our analysis of the price level according to the triangular contract invalid, since circulation of money outside this contract would have an influence on the price level. But in fact this is simply a confusion. The velocity of money can make no difference because any deposit that is involved in two successive transactions cannot compete with itself across these transactions. The source of the confusion becomes clear if we consider the relationship between the income velocity equation and the transactions velocity version:

$$MV = PT. \tag{4.2}$$

The income velocity equation can only be a guide to inflationary trends if *Y/T* is constant; if the added value for each transaction is constant.[4] There is no guarantee of this. What is guaranteed is that the velocity of money and the number of transactions is always directly related. Whatever the frequency of transactions and thus the velocity of money, the actual quantity of money is an upper limit to the demand for any good at any point in time, and so is part of the determinant of the price level. Of course this is then complicated by the choice of agents to hold their purchasing power inactive in deposits, which is further complicated in that any change in prices has ambiguous effects on this decision depending on expectations of the trend of future prices. So if prices are rising but anticipated to fall again soon, it makes sense to hold money; but if prices are rising and expected to continue rising, it makes sense to spend it before it loses more purchasing power. On average, failures of expectations should cancel each

[4] Added value in the sense of counting each additional entry of some resource (labour or material) into the monetary economy, while ignoring transactions in which these are subsequently transferred from one agent to another.

other out so that no higher money wage is demanded, but when there is a general failure of expectations then the type of inflationary (or deflationary) spiral identified by Timberlake for the real bills doctrine may come about since a higher money loan will then be required by firms. We will consider the further implications of this in Chapter 6.

4.7 Valuing Interest

We have identified the value of money as being determined in the form of a money account that is value within the triangular production contract. But what determines the monetary value of interest paid from the firm to the banker, which must also be determined as part of the contract?

Neither the neoclassical view that interest compensates for the loss of consumption of goods today, nor Keynes's loss of liquidity involved in lending money, are adequate explanations for the payment of loan interest (Heinsohn and Steiger 2006). The former is incorrect because in the money-creating contract creditor and debtor retain their physical possessions and their material returns, so in fact there is no transfer of goods. Thus it is a monetary rate of interest that applies. However, Keynes is also wrong to argue that liquidity has been given up when such loan contracts take place, since liquidity is only created in the process of money issue, and does not exist for this money beforehand.[5] But Heinsohn and Steiger argue that interest is compensation for loss of a property premium, because property has been 'burdened' to provide insurance that money issue is backed.

[5] This is different from the case where agents have a choice between holding deposits and other financial assets. Here 'liquidity preference' becomes a relevant factor in the interest rate demanded on these assets. (See chapters 3 and 6.)

In a sense it is true that commercial banks' reserves are in part backing for bad loans, which might otherwise cause deterioration in the acceptance of their deposits, but it is also true that the loss of interest on these reserves is a small part of the cost expended by a bank in administering its loan issues and by the government in establishing an appropriate legal and enforcement framework. Thus it seems that the Heinsohn and Steiger property premium, if it exists, is only a small part of the overall cost of issuing and administering loans and it is this overall cost that provides a rational basis for the charging of interest. Läufer (1998) argues that in equilibrium, since money is the asset with a zero credit risk, the marginal value of its liquidity must be equal to the interest incurred in borrowing it. That is to say, if money holders could earn more interest by lending on their money than they valued it in terms of its liquidity, they would no longer hold it. And should the marginal liquidity premium of acquiring more money be greater than the interest they would pay on acquiring more money, they would take out further loans. For lending then, the pledging of collateral can reduce the risk to the creditor and so reduce the interest charged[6]. In equilibrium this reduction equals the conventional risk premium. This, claims Läufer, is the actual source of Heinsohn and Steiger's 'property premium' that they claim accounts for the charging of interest.

While the 'encumbrance' of property in its role of debtor's collateral should reduce any risk premium, Läufer does not address the issue of what exactly interest is a payment for - yet this is precisely what Heinsohn and Steiger are purporting to do. He dismisses their explanation of interest as compensation for the need to restrict the transfer of the bank's property to ensure that there is a reserve ready to meet demands

[6] There are two types of risk involved here: firstly the risk of default for the loan issuer; secondly the risk of failure to redeem for a subsidiary acceptor of a security. The first is not passed on in the case of money, whereas it is in the case of bonds and similar securities.

for settlement of deposit withdrawals. For doing this the bank is compensated by a negative risk premium on interest they pay to depositors, and so payment of interest by debtors on this basis would represent double compensation. When deposits are withdrawn and settlement made, the debtor whose loan created them must still pay interest to the bank even though the risk of deposit default need no longer be covered by the issuing bank (Läufer 1998). In fact it must be that if a secure pledge of collateral is made by a debtor of the bank, all risk to the bank is limited, since the only risk of non-settlement of deposit withdrawal arises because of a default by bank debtors. With a secure and full pledge of property to compensate for default, this possibility is eliminated. If on the other hand, the debtor is unable to offer collateral, then in this case there will be a risk premium charged to the debtor, which in equilibrium will be equal to the cost to the bank of ensuring adequate reserves to meet outstanding depositor withdrawal settlements even in the case of default.

The basic interest payment must therefore cover the costs of assessing, evaluating and recording credit requests and issues, as well as covering deposit withdrawal arising from defaulted loans.[7] Were all these in fact to be costless the equilibrium interest charged in a competitive banking environment would be zero.

4.8 Conclusion

Having in the previous chapters identified the source of the acceptability of monetary tokens in a triangular production contract, where labour and resources are supplied in exchange for claims to output, in this chapter we have identified the same process providing the valuation of money through the formation of an abstract money of account that has its value defined in relation to the inputs and outputs of the

[7] In a multi-bank environment these costs include access to base money, either by direct borrowing from the central bank or by attracting the net transfer of deposits from other banks.

production contract. We have considered and rejected the views that money could have a value through convention, through market exchange, through state taxation demand or through property encumbering. Essentially the 'real bills' doctrine that money would retain its value as long as it was only issued in exchange for reliable promises of the supply of goods is correct, but we have generalised this to show that in a modern monetary economy the value of money depends on the features of production.

We have also argued that since the relationships of the central bank, commercial banks and private sector agents can also be expressed as triangular contracts that give rise to valued money, we should look at these too as being some form of production contracts. In fact it turns out to be perfectly reasonable to see the state as producing services, the inputs for which are paid for in money and the outputs exchanged for money in the form of taxation. The non-excludability of state-provided services and the legally-enforced nature of taxes pushes the reaction to the valuation of state money into the political as much as the economic sphere, but in any case state and private production are aggregated against the value of money by the convention of a fixed one-to-one exchange between state and private money.

Finally in this chapter we concluded that the interest rate charged for production loans must also be determined within the triangular contract, and argued that this relates to the real costs of lending. In the next chapter we move on to the relationship between money and the rest of the economy.

Chapter 5. Money and the Macroeconomy

5.1 Introduction

In the previous chapters we have generally considered money as a phenomenon in its own right, but ultimately flows and stocks of money are in themselves only significant in how they affect what happens in terms of goods and services that have real and direct effects on human welfare. In this chapter we now turn to consider the relationship between the nature of money and the real economy as a whole.

In our model of endogenous money creation outlined in chapter 3 we have argued that money is a transferable token of a debt, taken on by a bank on the basis of the bank's belief that the debtor has some plausible way of acquiring an income stream to repay that loan *and* allow recompense for the bank's administrative and risk-absorbing efforts in term of purchasing power over real goods and services.

Where there is only one bank it is clear that the required income stream can only be achieved (typically by a firm) marketing a previously unmarketed good or service, because either it did not exist – new production, or because a pre-existing good or service is newly introduced into the monetary economy. By enabling the acquisition of capital goods and labour services before a firm's production output is completed, the creation of money expands the possibilities for production. These possibilities for production are further expanded as the debt tokens issued can be exchanged for a wider range of goods and services, enhancing the scope of labour and firm specialisation.

Along with these developments, exchange between individual non-firm agents becomes simplified by the existence of widely accepted tokens with established exchange value for many different production goods. Furthermore, the usual durability, pre-assigned stable value (in terms of debt repayment) and acceptability of these debt tokens makes them ideal stores of wealth – to be held as deposits temporarily devoid of the purpose of purchasing goods. In chapter 4 we also considered how the expected value of money was determined in the contract giving rise to its issue and suggested that interest rates are also determined by factors in this contract.

So how do we go about conceptually integrating money into the real economy? First we consider models that see the real economy as a general equilibrium construct, even though they may not, for the reasons given in Chapter 2, have an equilibrium view of the existence of money. We explain the reasoning behind the construction of these models within the neoclassical paradigm. It turns out that these models cannot provide an adequate basis for modelling money in the economy even if we accept the basis of their modelling of the real economy.

In the following section we show why neoclassical general equilibrium models of the economy cannot in any case give us the hoped for insights into the real economy even if they could absorb a reasonable concept of money into their workings. We consider two models of the monetary economy that have more realistic concepts of money in the economy; that of Delli Gatti and Gallegati (1997) and of Palley (1991-2), but we find that their focus on aggregate market clearing, and over precise behavioural functions mean that they fail to capture the picture of money we are seeking. We turn finally to a Stock-Flow Consistent model of Godley and Lavoie (2006) that consists of strict asset and liability accounting within a sequence economy. This, we argue, can provide us with the sort of framework we need for analysing the way the working out

of the triangular production contract impacts upon the real economy, once we have established how money and pricing can work in such a model.

5.2 Money and Equilibrium Economies

5.2.1 The RBC/DSGE approach

The 'Lucas Critique' pointed out the inconsistency of general equilibrium models that did not take account of likely changes in the economic behaviour of individuals as a direct response to knowledge of exogenous policy changes (Lucas 1976). As a consequence models became based on generic microeconomic decisions that involve utility maximisation for individuals and households and profit maximisation for firms, all on the basis that future expectations conform to those predicted by the model itself. This 'rational expectations' behaviour is made subject to constraints, typically a budget constraint but also including constraints arising from the production function, incentives, information and the reactions of other agents.

Intertemporal links were introduced to these 'Real Business Cycle' (RBC) models, usually in the form of assets originating from a budget-constrained government sector such as money and bonds.[1] A role for money could be introduced via the existence of a cash-only good in the individual/household utility function, budget constraint or production function. The intertemporal links meant that individuals/households did not simply optimise within a single period, but must plot an optimal path of consumption (hours of labour, asset holding if present in the model) over time. Another form of link that could exist between time-periods in these models is the existence of an enduring capital stock, built up directly by household saving (consumption foregone). Stochastic parameters are introduced that impact upon

[1] The term 'Real Business Cycle' relates to the initial focus of these models on real (non-monetary) variables as the drivers of economic fluctuations.

production and other variables, so that these are deflected from what would otherwise be their optimal paths.

Dynamic Stochastic General Equilibrium (DSGE) modelling developed from Real Business Cycle (RBC) modelling, but incorporated 'Keynesian' insights: 'sticky' wages or prices, contracting or menu costs adjustment costs to coincide with empirical observations that not only real shocks to the economy were important, but expectational and monetary shocks too. The combined effect is to prevent smooth return to the optimal path. Despite these embellishments, however, there are mechanisms that always tend to match labour offered with that required, output supplied with consumption demanded and savings of households with addition to the capital stock, and so fulfil a unique long-term equilibrium. Therefore the persisting disequilibrium in the private sector necessary to explain the issue and holding of money is assumed away.

Thus equilibrium models of the real economy frequently introduce money by appending to the core model a government sector that goes into debt with the counterpart of this debt being money (Graziani 2003, p15). Modern 'microfounded' models of the monetary macroeconomy optimise utility and/or profit functions which may contain money (money in the utility function, or MIU) subject to constraints that relate to the holding of various assets, including money, and/or a constraint that relates money received with consumption of one or more real goods (cash in advance, or CIA). In this way changes in the quantity of money demanded and/or supplied or its opportunity cost as the return on other assets alters will affect the quantity of money held in equilibrium. The introduction of money into the private-sector economy in these models is most commonly an exogenous process; taking the form of a lump-sum transfer to households that is linked to government expenditure.

5.2.2 Money in the Utility Function

Unlike agents in the private sector, the government sector may have a current deficit in its budget in any period. In such models, the amount of government debt not financed by selling securities is equal to the quantity of money demanded by the market, so the government budget constraint for period *t* defines the money stock according to the general form of

$$M_t = M_{t-1} + G - T - (B_t - B_{t-1}) - i_t B_{t-1}, \tag{5.1}$$

where M_t represents the money stock in period *t*; *G* is government expenditure; *T* is the the tax yield; B_t is the stock of government bonds at the end of period *t* and i_t the interest rate paid on government bonds.

A representative of this sort of model is that of Buiter (2005). His model is of a closed competitive economy with a single one-period commodity. Households' income consists of an exogenous endowment $y_t > 0$. Households consume $c_t \geq 0$ and pay lump-sum taxes τ_t. There are financial claims in the form of fiat base money, one-period nominal government bonds and one-period real government bonds. The amounts of these claims outstanding at the end of period *t* and carried into period *t*+1 are respectively, M_t, B_t and d_t. Since there is no production, the problem of reaching equilibrium in the private sector is bypassed in the model.

In the model the representative household has the period *t* budget constraint

$$\frac{M_t}{P_t} + \frac{B_t}{P_t} + d_t \equiv (1 + i_t^M)\frac{M_{t-1}}{P_t} + \left[(1 + i_t)\frac{B_{t-1}}{P_t} + (1 + r_t)d_{t-1}\right] + y_t - \tau_t - c_t, \quad t \geq 1, \tag{5.2}$$

where i_{t+1}^{M} is the risk-free nominal interest rate on money held from period *t* to *t* + 1; i_{t+1} is the risk-free nominal interest rate on nominal bonds and r_{t+1} the risk-free real interest rate on real bonds. $P_t \geq 0$ is the period *t* money price of the commodity. Arbitrage equates the risk-free rates of return on nominal and real debt. In each period, the household maximises the following utility function, subject to (5.2).

$$\sum_{j=t}^{\infty}\left(\frac{1}{1+\rho}\right)^{j-t} u(c_{j,}m_j); \quad \rho > 0, \quad c_j, m_j \geq 0, \tag{5.3}$$

where ρ is the households' time discount factor and real balances $m_t \equiv M_t / P_t$. Each period felicity function is increasing in consumption and end-of-period real money balances.

Maximisation of utility function (5.3) subject to the budget constraint (5.2) gives first order conditions for households' optimal behaviour of a marginal utility trade-off between consumption in the present period and consumption in the next period. This trade-off depends on the return on real bonds held between periods and the time discount factor. There is also a marginal utility trade-off between money holdings and consumption within the present period. This latter trade-off depends on the difference between the relative returns on nominal bonds and money. These are standard results for this type of model.

The government's budget constraint in this model follows the pattern of Eq 5.1, and is given by

$$M_t + B_t + P_t d_t \equiv (1+i_t^M)M_{t-1} + (1+i_t)B_{t-1} + P_t(1+r_t)d_{t-1} + P_t(g_t - \tau_t), \tag{5.4}$$

where g_t is government spending, and τ_t is net lump-sum taxation paid by households. Since base money need never be redeemed, the government receives real seignorage income. Prices are flexible and the goods market clears each period.

Without specifically considering the results of such models, what can we say about this one in the light of our previous discussions about the origin and nature of money? Firstly and most obviously, this is a model without production; new consumption goods are apparently endowed from heaven. There is no explanation for the income that households receive, and so no linkage between income and the goods to be purchased with that income. No money can arise from the actions of private producers, as there is no such sector in the model. Even if we assumed that the income endowment were paid in money and all consumption paid for in money, the fact that both are stated in real terms means that unfulfilled (and overfulfilled) expectations in the goods market are ruled out by assumption.

In this model money is held because it is in the utility function. When the marginal utility of holding money is greater than the marginal utility of consumption as specified by the function, then money will be held in preference to being spent on consumption. So why does money have a marginal utility in the model? The assumption underlying its inclusion in the utility function must be that it provides liquidity services, as it cannot be a factor in production since there is no production in the model. Yet as far as households are concerned, as long as they work within their budget constraint they can use any financial asset to exchange for consumption or to pay their taxes. Households will thus hold whatever financial asset bears the greatest return, and this will not necessarily be money. The Buiter model thus lacks any genuine explanation as to why anyone in the private sector should necessarily hold money, and this is surely devastating for any model that purports to predict the role of money in the behaviour of other economic variables.

Moreover, even were money to offer a liquidity service, while this could account for the use of money within a period, given the absence of uncertainty in the

model it cannot account for the holding of money between periods. Any money required for transactions in the period would be acquired at the beginning of the period and wholly exchanged for consumption by the end of the period, since there are no expectation failures in the goods market or in the market for financial assets. In this model there is no real justification for treating money as any different from other financial assets, the holding of which depends wholly on their rates of return.

5.2.3 Cash in Advance Models

Another group of models, of which that of Cooley and Hansen (1995) is a representative example, introduce a subset of consumption goods into the household's utility function and budget constraint that can only be purchased with previously accumulated cash balances. Their aim is to allow the 'study of the features of an economy where money is valued in equilibrium' (Cooley and Hansen 1995, p194).

In Cooley and Hansen's model aggregate output, Y_t, for the economy is produced according to a function of the Cobb-Douglas form, with K_t and H_t the aggregate capital stock and labour input respectively, and z_t a randomly generated technology shock:[2]

$$Y_t = e^{z_t} K_t^{\theta} H_t^{1-\theta}, \quad 0 < \theta < 1. \tag{5.5}$$

Such a function has constant returns to scale, and is justified on the basis that capital and labour shares of output have remained approximately constant despite changes in relative prices. The parameter θ represents the fraction of output accruing to capital

[2] It has been convincingly argued that empirical evidence that appears to support the ubiquitous neoclassical (Cobb-Douglas) production function is an artefact. Regressions run on deflated monetary values find a coefficient representing a 25% mark-up even when Cobb-Douglas production functions with constant output elasticity of capital equal to 0.75. If this is so, then econometric estimates of the production function are simply reproducing the national account identities, whatever the underlying shares of output (Godley and Lavoie 2007; Felipe and McCombie 2006).

when paid its marginal product, and 1-θ the fraction accruing to labour. The portion of aggregate output not consumed, X_t ,is invested in physical capital, so that

$$K_{t+1} = (1-\delta)K_t + X_t, \quad 0 < \delta < 1. \tag{5.6}$$

Real saving and investment are thus conflated in the model and it is implicit that the investment decision is the outcome of decisions by households, not firms. Firms are assumed to 'maximize' profits (on the assumption of constant returns implicit in the production function, they can in fact do no more than eliminate losses and so make zero profits in equilibrium). The utility function for households is given by

$$E_0 \sum_{t=0}^{\infty} \beta^t [\alpha \log c_{1t} + (1-\alpha) \log c_{2t} - \gamma h_t], \quad 0 < \beta < 1 \text{ and } 0 < \alpha < 1, \tag{5.7}$$

where c_1 is a good that can only be purchased using previously accumulated cash balances*;* c_2 a good exchangeable for any form of wealth and h_t labour supplied by households. In each period, each household can purchase c_1 goods according to

$$P_t c_{1t} = m_t + (1+R_{t-1})b_t + \tau_t - b_{t+1}, \tag{5.8}$$

where P_t is the price level in period *t*; m_t is cash held over from the previous period; $(1+R_{t-1})b_t$ is principal plus interest from government bond holdings b_t; τ_t is a nominal lump sum transfer (or tax) paid at the beginning of the period and b_{t+1}, are bonds acquired in the current period to be carried into the next.

The overall budget constraint for households is

$$c_{1t} + c_{2t} + x_t + \frac{m_{t+1}}{P_t} + \frac{b_{t+1}}{P_t} \leq w_t h_t + r_t k_t + \frac{m_t}{P_t} + \frac{(1+R_{t-1})b_t}{P_t} + \frac{\tau_t}{P_t}, \tag{5.9}$$

indicating that household expenditures include purchases of the two consumption goods, investment x_t, money carried over to the next period m_{t+1} and government-issued

bonds. No household borrowing is permitted. The assumption of constant returns to scale of production, identical firms and identical households with no economic interaction between them allows aggregation from individual firm and household behaviour to the macro level.

Firms' and households' behaviour must be consistent with that of the government, which has the following constraint:

$$P_t G_t + T_t = M_{t+1} - M_t + B_{t+1} - (1 + R_{t-1})B_t \,, \tag{5.10}$$

where G_t is real government consumption; M_t the stock of money, T_t is nominal transfers net of taxes and B_t nominal government debt.

In this model, as in the Buiter model described in the previous section, money is again a liability of the government but money does not itself appear in the utility function. While this has the merit of attempting to introduce a limited availability of money as a factor in household decisions, it hardly captures the welfare-enhancing features of money, with agents simply having specific preferences over cash and credit goods. There is no increase in the consumption set available, and no increase in the volume of production from using money. Moreover, money remains a creature of the government, in that the total supply is part of the government's budget constraint, and exogenous in the sense that it arises as a realisation of a stochastic process.

5.2.4 Assessment of Equilibrium Models with Government Money

To the extent that the two models above deal with a representative consumer and a representative firm, no general purchasing power is explicitly required for exchange transactions. We can assume that it is used, becoming visible when held or when used for the purchase of the cash goods of the CIA model, but there is no sign of the frictions or commitment problems that provided justification for the existence of

money in the debt models of section 2.3. Households automatically and costlessly adjust their real consumption and financial asset holdings and prices immediately adjust to ensure firms are not left with unsold goods, yet prices have no impact on income (endowment in the Buiter model, wages from production in the CIA model) since these are constant in real terms. Another feature of these models is that, with the exception of the CIA constraint on a subset of goods in the second model, there is no liquidity limit to transactions or consumption. We must conclude therefore, that neither of these models can illustrate the features of real economies that give rise to the use of money, nor additional features that are particular to monetary economies rather than ones that could proceed by barter.

The idea that the only money in the economy is formed by government liabilities is in general problematic. If this were the case the central bank would have the impossible task of both ensuring government borrowing met the requirements of public expenditure and was also at the level required to introduce the appropriate amount of money into the economy.

5.2.5 Money in the Production Function

The model of King and Plosser (1984) claims to include money as an endogenous variable in a model that generates real business cycles. They do this to operationalise their view that the output of the financial and banking sector is an input into the production and purchase of final goods. Their model consists of two productive sectors with one intermediate and one final good. The output of the final goods industry is stochastic and serves as either a consumption good or as an input into future production. The output of the financial industry is an intermediate good referred to as ‘transaction services’. These are used by firms in the final goods industry and by households to economise on the time and resources required for the exchange of goods.

The output of final product *y* is formed by a constant return to scale process that uses labour *n*, capital *k* and transactions services *d* as inputs:

$$y_{t+1} = f(k_t^y, n_t^y, d_t^y)\phi_t\xi_{t+1}, \tag{5.11}$$

where k_t^y is the amount of capital in commodity units allocated to production at time *t*, n_t^y the amount of labour services in hours and d_t^y the amount of transaction services (defined as the number of book-keeping entries made) used in the production of final goods. There are positive and diminishing marginal products to each factor of production. The process is subject to random shocks ϕ_t and ξ_{t+1}.

Productive firms are identical and operate competitively, selling goods at price p_t and purchasing labour, capital and transaction services at rental prices w_t, q_t and ρ_t respectively. This gives each firm the profit maximisation problem

$$\pi = p_{t+1} f(k_t^y, n_t^y, d_t^y) - w_t n_t^y - q_t k_t^y - \rho_t d_t^y. \tag{5.12}$$

The production function for the financial sector is

$$d_t = h(n_t^d, k_t^d). \tag{5.13}$$

In contrast to the production function for goods, this function is instantaneous, indicating that the production of transaction services is a much faster process than that of the production of goods. Again this production function is assumed to give constant returns to scale. Households in the model consume, supply labour and purchase transaction services to minimise their transactions costs and select an optimal pattern of consumption, labour supply and asset allocations.

King and Plosser claim that their model, by showing positive co-movement in equilibrium of real production and transaction services matches the empirical evidence

showing a positive correlation of output and measures of bank clearing. They suggest a link between the flows of transaction services in their model and observed stocks of deposits (or 'inside money' as they term this). To generate this link they assume that this stock of deposits is proportional to the flow of transaction services. Under this assumption they claim as an implication for their model that the volume of inside money is positively correlated with output more or less contemporaneously when there is an unexpected output event, as denoted in the model by ξ_t (Equation 5.11). A shock that shifts intertemporal decisions, as denoted in the model by ϕ_t, produces an increase in transaction services prior to an increase in output.

On the face of it, if we accept King and Plosser's correlation of transactions services with deposit money, there are some features here that match what we are seeking in a model of the monetary economy. Money is produced in the private sector, and is produced in greater quantities in association with increased production or increased planned production. This is only superficial, however, and there are deep-seated reasons why we cannot accept the King and Plosser model as an acceptable representation of a monetary economy. Firstly, there is no link between the issue of money to firms for production and its availability to consumers for spending and saving. Both firms and individuals can independently purchase transaction services up to the point at which there is zero marginal profit or utility respectively. Secondly, despite the authors' identification of flows of transaction services with stocks of deposits, there is in fact no motivation whatsoever for transaction services to be 'held' from one period to the next since there are other assets that earn a positive return, and given the knowledge of the probability distribution for the shocks to the economy there is no benefit from acquiring transaction services before the instant they are required for transactions. Thus there can be no stock of money in this economy. Thirdly the

valuation of this 'money' bears no relation to any exchange value for goods; its value is simply its marginal contribution to profitability or to utility for firms or households respectively. Deposit 'money' in this model is not money in the sense that we have so far recognised it.

Visser (1989) makes the further point, that in exact contradiction to King and Plosser's model, where all inputs to production including transaction services see constant returns to scale, the existence of money in the real economy gives rise to scale economies. Increasing returns to scale mean that no pure competition and thus no welfare-optimising competitive equilibrium can exist.

5.3 Assessing Equilibrium Macroeconomics

5.3.1 The Reality of Models

Apart from the specific issues with the models we have described, there are deeper problems. The bottom-up optimising models of the RBC and DSGE type rely on identically specified and endowed agents to ensure that the solution to the simultaneous equations describing the economy reach a single plausible equilibrium. But a system of simultaneous equations which is complex enough to capture a variety of heterogeneous agents will have multiple equilibria and complex dynamics (Colander 1996a). General equilibrium is neither unique nor stable for many plausible sets of consumer preferences and endowments. It has been shown that only infinite information can guarantee that a price adjustment process always converges to equilibrium (Ackerman 1999). According to Kirman the problem of equilibrium economics arises from the standard economic habit 'of treating individuals as acting independently of each other' (Kirman 1989, p137).

When such microeconomic theory that describes economic relationships at the individual level is applied to aggregate data, this assumes that the relationship between elements of the structure will be preserved at higher levels. This arbitrarily assumes a homogenous system with a persisting linear hierarchical structure. More specifically it requires:

1. Homothetic preferences that are linearly homogenous[3]
2. Identical production functions for all firms
3. Homogenous and infinitely divisible commodities and factors of production
4. A common set of prices with a constant relative ratio
5. A fixed distribution of income endowments over time

Since these are not generally to be found in real economies, then rational choice-theoretic foundations have very few aggregative consequences and a neoclassical Walrasian micro model is consistent with a wide range of phenomena at the macro level. The presence of agents with diverse tastes, endowments and technologies, the presence of mediating institutions, macroeconomic externalities and feedback from macro events to micro behaviour all confound attempts to build up macroeconomic models from individuals' microeconomic behaviour.

As evidenced by the Buiter model in section 5.2.2, the common 'solution' to the problem of multiple equilibria is to model the behaviour of the whole economy as if it were a single agent (the 'representative agent'). But there is no evidence that an aggregate of maximising individuals can ever be considered as a single maximising agent. The reaction of the representative may not be the same as the aggregate reaction

[3] So that the proportions of different goods consumed are uninfluenced by distributional considerations.

of the individuals represented and the preferences of the representative individual may be different from that of every individual. There is also evidence to show that well-behaved aggregate demand functions can actually arise from the aggregation of non-maximising agents, if their preferences are far enough spread out (Kirman 1992). The conclusion must be that the standard utility-maximising model used as the foundations for modern mainstream macroeconomic models is neither sufficient nor necessary for stability at the macroeconomic level. Moreover, the behaviour of consumers, workers and firms can be tested empirically. There is much evidence to suggest that consumers' and workers' behaviour is far from rational or consistent and that firms are unlikely to be pure profit maximisers (Camerer et al. 2004).

Yet the real economy does not exhibit wholly chaotic results, so we must look for institutional arrangements that create the relative stability we observe (Colander 1996b). Such arrangements constrain the behaviour of individuals, and include legal and social conventions and the creation of markets by the firms who wish to sell in them. The latter means that the acquisition of a consumption good does not require a random search among all humanity for someone in possession of that good and willing to part with it, but the seeking of a firm that can be trusted to have a variety of goods available for purchase on predictable terms. The existence of such firms, however, is not compatible with the direct barter equilibrium economy of equilibrium macro models (Clower and Howitt 1996).

> [B]efore there is hope of undertaking meaningful micro analysis, *one must first determine the macro context within which that micro decision is made.* It is that macro context that lets individuals choose among likely multiple equilibria and makes the choice theoretic foundation contextually relevant (Colander 1996b, p61. Italics in original).

Even if perfectly competitive Walrasian markets existed, they would not be stable institutions. They would create an incentive to monopolise markets and would require

more rationality than individuals have (Colander 1996a). To make our actions predictable to each other and allow complex co-ordinated economic processes to take place we develop simplified behaviour patterns, routines and rules in the form of institutional structures and behavioural conventions. Thus there appear to be persisting features of the economy in terms of its institutions, levels of flow and stocks in particular regions. If we do not identify these features correctly then we have no chance of modelling the changes that take place from period to period. So we turn to the two most important organising features: monetary markets and firms' need to ensure a monetary return that matches their outlays.

5.3.2 Markets and Money

Equilibrium requires markets to process goods and services offered and demanded and reach a stable outcome. Yet in reality, the 'Walrasian auctioneer' as a central neutral processor proffered by neoclassical economic theory and programmed to solve this problem by price adjustment does not exist, and no real market can exist independently of the incentives of those that set it up. And there are few markets set up by neutral unbiased parties. Even when this is arguably so, for a national stock market or even a local food market organised by the local authority, the sub-markets in particular categories of stock or of produce cannot be easily be separated from their promoters or producers.

There is much more to the structure of markets than fully-informed, rational individuals adapting to all events at the margin. If this were not so, behaviour would probably be unpredictable and incomprehensible (Liefonhufvid 1996). The complex, co-ordinated processes that allow the coherence of the weekly family shop at the supermarket or the on-line booking of an airline ticket, quite apart from the markets that link producers (as Eichner (1987) is at pains to point out), requires simplified behaviour

patterns, routines and rules that make our actions predictable to each other. Market interactions actually involve acquiring information feedback from our imperfect decision-making; whether in terms of quantities and/or prices – so that no set of market processes can possibly represent an aggregate of mutually consistent optimal decisions.

The most likely candidate for the organising principle of a modern developed economy seems to be the institutions involved in the creation, circulation and destruction of money. These are all-pervasive.

> Money is a social convention that makes the aggregate economy operate more efficiently. It affects the co-ordination of the entire system and reduces the number of calculations an individual must make…[M]oney is part of the macrofoundational structure of the economics system…(Colander 1996b, p62).

As a consequence of the organisation and operation of markets by firms, the acquisition of consumption goods does not force us to search randomly among humanity for someone in possession of that good and willing to part with it in exchange for something we have and are willing to part with. Instead a firm that can be trusted to have a variety of goods on display and available for purchase on predictable terms may have access to enough of our trust that we will purchase the good at the price at which it is offered.

> [T]he problem of accounting for monetary exchange is just the problem of explaining why the firms that make markets do not routinely deal in direct barter…(Clower and Howitt 1996, p26)

Our explanations of why firms use money would include the following:

1. Firms introduce money into the economy in the process of acquiring loans to pay for wages or investment goods.

2. They need to acquire money to repay debts.

3. They can dispose of their products more easily if they are willing to exchange them for money.

    a. It is easier for consumers to buy on impulse – what they are foregoing they do not yet have and so cannot value.

    b. They can facilitate (or even provide directly themselves) credit by consumers for purchases.

Under the credit-based system of money whose creation, flow and destruction we described in Chapter 3 and whose valuation we accounted for in Chapter 4, an increase in the amount of money in circulation occurs as an endogenous response whenever one of the non-financial sectors uses loans to finance outlays. There is then a circular flow of these funds among the various sectors of the economy. This flow occurs alongside the flow of produced goods to consumption and a flow in the opposite direction of labour from households to firms. Eichner (1987) describes the significance of this in macroeoconomic terms. If there is a change in one sector's financial position without an increase in the overall amount of funds in circulation, i.e.: its gross savings have increased relative to tangible investment, this can only be at the expense of some other sector. If there is a change in the overall amount of funds in circulation with the amount of those funds increasing as the sector's financial investment increases subsequent to a payment made that has been financed by a loan from a bank, then a different picture emerges. The sector making the payment will have both increased its financial liabilities (in the form of the loan) and increased its financial assets (in the form of additional deposits). Following the payment some further physical or financial asset is acquired – it being on this basis that the loan was likely to have been made in the first instance. Thus no limitation on the amount of funds in circulation exists. This

is the critical link between the monetary sector and the real economy of production and exchange of goods and services.

5.3.3 Price-clearing v. Price-setting

The price-clearing market assumption of mainstream macroeconomic models is also widely challenged. Colander and van Ees (1996) go so far as to state that the modern economy is by no means ideally co-ordinated by the price mechanism, nor could it conceivably be so co-ordinated. Godley and Lavoie describe and reject the purported process as follows:

> Excess demand leads to higher prices, which is assumed to reduce excess demand. This mechanism is put into effect within the period, before transactions are made. When transactions occur, as reflected in the transactions-flow matrix, supply and demand have already been equated through the price-clearing mechanism. We believe that such a market clearing mechanism, based on price variations, is only appropriate in the case of financial markets. In the case of goods and services markets, and in the case of the so-called labour market, we believe that the hypothesis of market-clearing equilibrium prices is wholly counterfactual, inappropriate and misleading (Godley and Lavoie 2007 p64).

Price-clearing is the exception rather than a rule in an advanced economy because it is only in commodity markets where individual sellers are so numerous and so small that they are unable to exert any significant influence on the price (Eichner 1987). In this case, when prices are given, the firm decides how much to produce and then puts all of its output on the market at this price. Any imbalance between demand and supply is then eliminated through an appropriate change in price. Eichner distinguishes the firms in such markets by their direct control by a small number of owner-entrepreneurs and the small number of plants which they control. As a consequence, and since the firms' residual incomes are the sole source of compensation for these owner-entrepreneurs, it can be assumed that the goal of such firms is to maximise the amount of 'profit' earned by the firm in any period. Eichner also claims

that because such firms cannot easily expand operations beyond an initial small number of plants, the firm is subject to variable returns as production is expanded or contracted. Thus this sector faces the typical U-shaped cost curves of textbook analysis (Eichner 1987, p393).

By contrast, it is what Eichner terms 'industrial markets' that predominate in the modern economy. In such markets, sellers are sufficiently few in number and with a well-protected market position such that they can influence the market price directly. These firms, therefore, can decide on both the quantity they will produce and the price which buyers will have to pay. Under these conditions, the firm sets the price and then sells whatever quantity it can at that price. Thus, when there is an imbalance between demand and supply, the necessary adjustment occurs through the quantity variable rather than the price variable. A decline in demand is experienced as a decline in sales rather than as a weakening of the market leading to a fall in the industry price. Similarly, an increase in demand is experienced as an increase in sales rather than a rise in price. Here there are no neutrally organised markets for manufactured goods such as those that exist for shares or commodities. The predominance of price-setting behaviour by firms is supported by the empirical work of Godley, Coutts and Nordhaus (1978).

Since firms manufacturing goods generally make their own markets, disequilibrium in a market leading to a decline in sales of some or all of their products leads not usually to reductions in prices, but to reductions in sales (Clower and Howitt 1996). This suggests that rather than *wage* adjustments, labour force *quantities* will be susceptible to adjustment by firms, with resulting unemployment or labour-market pressure.

5.3.4 Macroeconomic Equivalences

The main equivalences in equilibrium macroeconomics are automatic results from the fact that the value of commodities at cost that are produced in a period but not sold for consumption must be equal to the value of the income received by labour and the other factors involved in their production but not spent on consumption. The consequence for the models is that investment must equal saving. National accounting convention means that this equivalence occurs irrespective of the actual establishment of productive equipment which can increase the output of the economy over the long term. In fact, voluntary saving by consumers may inhibit production by preventing firms recouping the value of their output (Eichner 1987).[4]

While it is true that with a constant positive level of non-consumption by households, the current level of income might match the current level of output if any addition/reduction to saved funds matches the withdrawal of these funds to purchase productive plant and the premises to house it, this is entirely contingent (Graziani 2003). Thus the equality of income and output seen in national accounts or flow of funds tables is not evidence of a real 'equilibrium' between investment and non-consumption or income and output, but almost always arises purely as a consequence of the definitions of profit and residual income; i.e.: any discrepancy between what is earned by individuals and what is spent by them becomes automatically matched by the gap between firms' revenue and what they must pay out (overwhelmingly, ultimately, as labour costs). The importance of interest rates then, is not that they mediate an equilibrium between the supply and demand of investment funds, but that on the one hand they represent the costs to be covered by banks' issue of loans, and on the other

[4] See discussion of deposit holding in Chapter 3.

they play a part in the liquidity preference of households as they decide between holding financial wealth as money or as firms' securities.[5]

Investment decisions are critical to how the economy develops because investment does not take place automatically following on from earlier decisions as income and consumption generally do, but is postponable and it can be entered into even if there is no surplus from the firm's activities by means of external financing. This involves both the (limited) redistribution of the gross saving of other sectors and the creation of new funds by the banking sector. Both Eichner (1987) and Godley and Lavoie (2007) share the conviction that this discretion (enabled especially by money) means that the flow of income may intermittently fail to match the flow of output – and that it is the level of aggregate demand that feeds back to the subsequent level of aggregate supply through reduction in sales of output, increased inventories and a reduction in output. Let us now turn to some rather different models.

5.4 Macroeconomic Models that Take Money Seriously

5.4.1 Delli Gatti and Gallegati

This very complex rational expectations equilibrium model introduces money into the economy in part through a wage bill loan. Production is very basically modelled as being

$$y = n, \tag{5.14}$$

where y is output and n employment. Firms do not, however, wholly finance the wage-bill from borrowing however, since

$$Wy = A + B, \tag{5.15}$$

[5] This issue we have already discussed at some length in Chapters 3 and 4.

where W is the nominal wage, B is firms' borrowing and A is the 'equity base' of firms. The way the model is determined means that the size of the equity base (and therefore the relationship between firms' borrowing and the wage bill) is influenced by unexpected price rises and the interest rate. Delli Gatti and Gallegati introduce an aggregate demand function

$$M = Py, \tag{5.16}$$

where M is the money supply, and P the expected price level. The money supply is the sum of high-powered money and corporate borrowing:

$$M = H + B. \tag{5.17}$$

This is a one period model, so monetary flow consistency must exist within the model. We can rearrange equations 5.15 - 5.17 to show that

$$Wy = Py + A - H\ . \tag{5.18}$$

Given that the model does not allow the persistence of debt, or the holding of balances, our balance sheet analysis of Chapter 3 tells us that monetary consistency is only achieved if $Wy = Py$, which implies that $A = H$. Given that A and H are determined by separate mechanisms and are both negatively related to the interest rate, these equalities are entirely contingent. The model is therefore not consistent in monetary terms. Other features of this model are also unsatisfactory. It is assumed in the model that firms always repay all of their debts, even although firms have a non-negative risk of becoming bankrupt. Although there is a dividend flow from the equity base, there is no recipient for this flow.

5.4.2 Palley

An alternative one period model, constructed by Palley (1991-2), introduces the possibility of unemployment that arises because firms' production is 'for sale', rather

than 'for own consumption'. Because of this, unsold output is not demanded by the firms. Firms thus have the problem that they 'need to generate in advance demand to purchase output equal to the level of profit income' (Palley 1991-92, p188). In this model aggregate demand is given by

$$y^d = C_k + C_W + I\,, \tag{5.19}$$

where C_k is the consumption of capitalists; C_W the consumption of workers and I the exogenous level of investment expenditures. Capitalists consume out of current dividend income and deposits acquired in previous periods. Their propensity to consume is less than unity. Consumers consume their wages and new borrowing in the period net of interest payments on outstanding loans. Their marginal propensity to consume is always equal to unity. Since output is produced according to

$$y^s = f(N)\,, \tag{5.20}$$

where N is the level of employment, the goods market clearing condition is given as

$$\begin{aligned} pf(N) = {} & b_1[p_{-1}f(N_{-1}) - w_{-1}N_{-1} - r_F L_{F,-1} + i_{-1}L_{W,-1}] + b_1(D_{k,-1}/p - D_{k,-1}/p_{-1}) \\ & + (1+b_2)wN - (i+r_W)L_{W,-1} + pI. \end{aligned} \tag{5.21}$$

We can summarise the meaning of equation 5.21 as being that nominal output sales must equal the proportion consumed of capitalist's dividend income (earned on the basis of the previous period's profit) and any increase in the nominal value of capitalists deposits arising from an increase in the price level plus households' wage income and borrowing net of interest and outstanding loan repayments plus nominal value of investment expenditure. While this is perhaps closer to monetary consistency than the Delli Gatti and Gallegati model, there remain significant deficiencies. Firstly there is no link between the capitalists' failure to consume all of their income and the level of deposits (the latter being an exogenous and constant real parameter). Thus there is no independent role for fluctuations in money holding to impact upon effective

demand. Secondly the model provides no source for the investment expenditure. In monetary terms it appears from nowhere. The final major problem with this model is that, although borrowing plays an important part in the outcomes derived from it, the constant and increasing relationship between household wage income and borrowing is far too rigid to make analyses under changing economic conditions. While the marginal propensity to consume of one for households doesn't perhaps affect the model very much as it stands, it clearly adds to the general unreality of it.

To find macroeconomic models that truly respect the constraints of a monetary economy we will now turn to so-called Stock-Flow Consistent (SFC) models.

5.5 The Stock Flow Consistent Approach

5.5.1 The Relationship Between Households and Firms

In an extension to the accounting approach we have followed in our analysis of money in Chapter 3, we now turn to the Stock Flow Consistent (SFC) approach originated by Godley and Cripps (1983) and developed by Godley (2004), Dos Santos and Zezza (2006) and Godley and Lavoie (2004, 2007) among others. The SFC approach completely rejects the framework of general equilibrium modelling, arguing that individual welfare maximisation is not consistent with firms having an independent existence with distinct motivations such as growing the firm, because optimum prices, output and employment in these models are decided for them by the location of aggregate demand and supply schedules. As we have seen, in some such models these problems are assumed away altogether by amalgamation of households and firms into a single sector, so that no co-ordination is required. In any case, the fact that there is no time element to production in the previous models, and no excess demand or supply, means that there is no place for loans or credit money, and thus no role for banks. In the

real world, since firms generally operate under imperfect competition and increasing returns, they must decide for themselves how much to produce and how many workers to employ, what prices to charge, how much to invest and how to obtain finance. It is then the pricing decision of firms rather than the marginal productivity of capital and labour that determines the distribution of the national income between wages and profits (Godley and Lavoie 2007, p2). Credit comes into the picture since production is a time-consuming process and expectations are frequently falsified with persistent excess demands and supplies.

An important further point that Godley and Lavoie raise is that sales of investment goods give rise to receipts in the business sector, which receipts must themselves arise from the business sector – which is itself doing the investing. Thus they implicitly recognise the flow of profits issue that we discussed in Chapter 3.

For SFC modelling, any equilibrium or steady state is simply a theoretical construct which would be achieved if all parameters and functions the economy were given. Since in the real world they are not given, it is not clear what purpose such constructs serve. The only thing we can be certain of is that the individual items of economic expenditure and receipts must always and everywhere add up appropriately according to the accounting rules governing the monetary economy. As well as the coherence of different stocks and different flows there is also an important role for 'stock-flow' norms – ratios of stocks to flows that tend to be maintained over time. Firms are modelled as determining prices based on unit costs, and thus by tying together labour costs, interest costs and normal profits, income distribution is determined.

Like the circuit theorists, SFC theorists recognise that production is only made possible by bank advances as firms must go into debt before they can recover monetary

proceeds. The introduction of financial assets into the economy that are separate from real assets means that households can hold property rights to companies in the form of equities, over which they make portfolio decisions that are not necessarily made on the basis of the profit rate generated by capital goods. This is in contrast to neoclassically-based models, which if they do nominally separate households and firms, re-integrate them again by distributing all profits instantaneously to households and distributing all unconsumed household income instantaneously to the capital stock of firms. In the SFC approach, seriously involving the monetary side of production means that banks, their balance sheets and interest flows must be taken into account explicitly, along with the creation, circulation and destruction of money.

5.5.2 Features of SFC Models

The role of prices is in fact to distribute national income between wages, profits and creditors. There is no assumption of a production function with diminishing returns to labour and capital or of the existence of determinate profit-maximising levels of prices, wages or employment. On empirical grounds SFC models anticipate roughly constant returns to labour in the long run and increasing returns in the short-run. Demand for labour affects the wage-bill, but prices charged are insensitive to fluctuations in aggregate demand.

The basic principle of these models is that they use a current-price accounting framework, so that there are consistent balance sheets for each sector of the economy. Every financial asset has a counterpart liability and the balance between flows of expenditure, factor incomes and transfers is made explicit. It is these balances of stocks and flows and the consistent relationships between them that provides the stability to the economy that is absent in aggregated neoclassical models. In this way information can be presented about the flows of financial assets and liabilities by which savings

move through the financial system into investment, information that is completely absent from RBC and DSGE models.

5.5.3 Godley and Lavoie's Bank-Money World (BMW) Model

Although Godley and Lavoie's models subsequently become more complex, as an example we present a very simple model, but one that does introduce a commercial bank with firms requiring to borrow fixed capital (Godley and Lavoie 2007, chapter 7). This model conforms to the general principles described above, consisting of households, production firms and banks, but no government sector. There is a single financial asset, money deposits held by households, and only fixed capital expenditures are considered. Godley and Lavoie define a balance sheet for their model as shown in **Table 5.1**, and a transaction matrix for their model as shown in **Table 5.2**.

Components of the National Income and Product Accounts are arranged as transactions between sectors. Below this are the changes in financial assets and liabilities that correspond to the Flow of Funds Account. All columns and rows sum to zero, since all transactions must have an issuer and a receiver. In this model Godley and Lavoie assume an instantaneous quantity adjustment process, so that the matrix variables C for consumption, I for investment, N for employment and ΔL for the addition to the loan stock represents both quantities supplied and those demanded. The transaction matrix implies the following: the income identity

$$Y = C + I\,, \tag{5.22}$$

where Y is output, C consumption and I investment, and the firms budget constraint

$$Y = WB + r_{l,-1}.L_{-1} + \delta.K_{-1}\,, \tag{5.23}$$

where WB is the wage bill, L the stock of debt, r_l the interest rate on loans and K the capital stock. The subscript -1 denotes a value from the previous period. The surplus

income generated by the firms' sector in each period is exactly equal to that required to replace current capital stock depreciation, and forms an amortization fund *AF*, so that

$$AF = \delta.K_{-1}. \tag{5.24}$$

The firms' capital account constraint is

$$\Delta L = I - AF\ , \tag{5.25}$$

implying that all new capital stock is financed by an increase in the stock of loans. Households' disposable income is given by

$$YD = WB + r_{m,-1}.M_{-1}, \tag{5.26}$$

where M is the stock of money deposits and r_{m} the interest earned on these deposits. This implies that deposits increase according to

$$\Delta M = M - M_{-1} = YD - C\ . \tag{5.27}$$

Because $r_l = r_m = \overline{r}$ in the model, equations 5.23 – 5.27 imply that the outstanding stock of bank loans must be equal to the supply of bank deposits:

$$\Delta M = \Delta L\ . \tag{5.28}$$

Godley and Lavoie close their model with behavioural assumptions, including a consumption function for households:

$$C = \alpha_0 + \alpha_1.YD + \alpha_2.M_{-1} \tag{5.29}$$

and an investment function for firms

$$I = \gamma.(K^T - K_{-1}) + AF\ ' \tag{5.30}$$

where K^{T} is a capital stock target for firms determined by

$$K^T = \kappa.Y_{-1}, \tag{5.31}$$

and α_0, α_1, α_2, γ and κ are all given behavioural parameters. Godley and Lavoie run computer simulations to show the consequences of varying some of their model parameters.

Analysing the transactions matrix, it is important to realize that to the extent that firms can pay out the quantity *AF* without borrowing, depends on a transfer of investment funds from the capital account to current expenditure. This leaves open the question of where these funds come from. Godley and Lavoie's model does not start from the zero position and so cannot account for any increase in investment of the sort Eichner believes to be essential for survival (see Eichner 1987, p360).

Godley and Lavoie claim that their transactions flow matrix 'sets the monetary circuit…within a comprehensive accounting framework' (2006, p47), but this is not strictly correct. The general assumption of the monetary circuit approach is that initial finance for firms comes in the form of a loan for the wage bill (see e.g.: Graziani 2003, p27). The flow of money arising from this loan must then be specifically traced through the series of transactions that follow until it is back in the hands of firms allowing the initial loan to be repaid. The model described here does not do this.

In SFC models there are behavioural equations for the household and firms sectors, which are very general and do not make any General Equilibrium (GE) assumptions. They must therefore ultimately be confirmed empirically, and so specific parameterizations are in theory open to the Lucas Critique (see section 5.2.1). Contrary to GE macroeconomic models there is no explicit intertemporal maximisation by households – it is an empirical matter as to whether the parameters governing consumption in stock-flow models result in any degree of consumption smoothing. There is no marginal utility/product equilibrium assumed in the relationship between households and firms – instead there is a conflict between firms' power in the goods

market to set a mark-up and workers' power to demand a share of any productivity growth. How this is resolved is imposed by setting the parameters and how they evolve, and an inflationary wage-price spiral is certainly not ruled out. There is no overarching coherence to the firms' aims in investing. It is difficult not to see Godley and Lavoie's parameterisation of their model as somewhat arbitrary.

5.5.4 Money in the Stock-flow model

Money in Godley and Lavoie's model is a residual that arises endogenously from loans and is available as an asset for households. Digging deeper, we find that money is still not fully specified. Money is simply an alternative asset to be held by households as a consequence of misaligned expectations; there is no whiff of its essentiality as in a true monetary economy. Money is actually more essential for transactions in some neoclassical models through the cash-in-advance (CIA) constraints as discussed earlier in this chapter. As far as firms are concerned bank loans are simply another source of funding investment building, one which they can substitute at small relative costs.

While Godley and Lavoie clam that their matrices represent monetary transactions and they explicitly acknowledge the circuitist insight that loans are required for production, they do not specify the source of money for each transaction. The consequence of this is that they do not recognise the problem that our previous analysis of the monetary circuit uncovered. This problem is the need to account for the accumulation of monetary profits for the purchase of capital goods. The presence of a bank balance sheet in Godley and Lavoie's model does mean that both money holding and borrowing have consequences for the adjustment of assets, but this can take place through capital markets in a straightforward way. Nowhere do we see the true constraints and complications for the purchase and sale of consumption and investment

goods that must arise as a consequence of operating in an economy that overwhelmingly demands the use of money in its transactions. The quantity of money held may vary according to incorrect expectations, but uncertainty is not a motivation for holding money in way that the circuit view accounts for. The problem is that money is treated as a stock, whereas a major part of its importance is as a flow. Opening and closing balances must be modelled if the true role of money in the production and exchange of real goods and services is to be properly understood.

5.6 Conclusion

In this chapter we have surveyed a selection of macroeconomic models that attempt to introduce money and determine how monetary factors influence the workings of the real economy. We found that general equilibrium models could not handle money adequately or even consistently. In any case it is clear that modelling of the real economy as an equilibrium arrived at by the construction of a representative agent have been revealed as a dead end in macroeoconomic theory. Models that eschew the axioms of these model seem more promising, but still flawed. We found that of these, the Stock Flow Consistent class of models might provide a better framework, since they use a strict balance sheet and flow matrix structure that fits with our analysis of monetary flows in Chapter 3. Their behavioural closures, however, still mean that they are not flexible enough as they stand to explore the different mechanisms by which failed expectations within the triangular production contract are propagated through a monetary economy.

In the next chapter we will adapt the SFC model analysed in this chapter, making it less determined and with a better representation of money flows and then use

it to present our view of how the interactions within and between triangular production contracts are propagated through the real economy.

Table 5.1 Balance Sheet of Model *BMW*

	Households	**Production Firms**	**Banks**	∑
Money Deposits	*+M*		*-M*	0
Loans		*-L*	*+L*	0
Fixed Capital		*+K*		*+K*
Balance (net worth)	$-V_h$	0	0	$-V_h$
∑	0	0	0	0

(From Godley and Lavoie 2007, p219)

Table 5.2 Transactions-flow matrix of Model BMW

		Production Firms		Banks		
	Households	**Current**	**Capital**	**Current**	**Capital**	∑
Consumption	$-C$	$+C$				0
Investment		$+I$	$-I$			0
[Production]		$[Y]$				0
Wages	$+WB$	$-WB$				0
Depreciation allowances		$-AF$	$+AF$			0
Interest on loans		$-r_{l-1}.L_{-1}$		$+ r_{l-1}.L_{-1}$		0
Interest on deposits	$+r_{m-1}.M_{-1}$			$- r_{m-1}.M_{-1}$		0
Change in loans			$+\Delta L$		$-\Delta L$	0
Change in deposits	$-\Delta M$				$+\Delta M$	0
∑	0	0	0	0	0	0

(From Godley and Lavoie 2007, p220)

Chapter 6. Expectations Failure, Monetary Flows and Policy

6.1 Introduction

The previous chapters of this thesis have attempted to outline a picture of the monetary system that will allow us to use it as an organising framework for viewing the economy. We justify this on the basis that the monetary system is the overarching socially determined institution that governs the activities of a modern economy, and thus can be relied on to provide consistent landmarks in any reasoning about it. The features of this monetary system are firstly; triangular relationships between banks, firms and households that create credit-money, and secondly; an accounting system that ensures that financial assets and liabilities are always matched in aggregate. The triangular relationships also provide the grounds for acceptance and the expected valuation of the issued money. The accounting system gives the monetary economy structural landmarks. Our argument in the previous chapter has been that there are no other such landmarks available. The discussion there emphasised that axiomatic behavioural assumptions such as utility maximisation by consumers and profit-maximisation by firms cannot provide us with a consistent modelling framework. The arbitrary assumptions of neoclassical economics about production technology (homogeneity of capital, diminishing returns to capital and labour) and exchange technology (efficient markets clearing on price) are so far from everyday reality that

even pedagogical models with these characteristics should be rejected as worthless. Empirical economic relationships that do not rely on institutional permanence are always open to the 'Lucas Critique': that any observable (and thus known to some participants) change in economic circumstances may be known to any of them, and thus induce compensating direct action that confounds any predictions based on previous behaviour (Lucas 1976).

Yet we observe in the developed economies a considerable degree of order and predictability in the production of firms, the incomes of individuals and the purchasing of commodities. Where fluctuations occur they are generally around discernable trends. This can largely be put down to the flexibility of the monetary system that has developed since medieval times in the producing, marketing economies of the world, and in the way that it allows production and exchange efficiencies. Yet this flexibility is not without costs, and the balance between the gains and the costs of the monetary system must constantly be re-evaluated as the environmental and technological conditions of the world change.

In this final chapter, having regard to the picture of the money and banking system we have built up in previous chapters, we discuss how we can understand and weigh the gains and costs associated with our modern monetary system. Using these insights we then set the triangular production contract we have analysed in Chapters 3 and 4 in the context of a strict accounting of monetary assets and liabilities. We use this to analyse the consequences of failed expectations within the contract and consider how policy measures might influence these consequences.

6.2 The Gains from Money

The modern world is built on the harnessing of human ingenuity, along with the natural resources of our planet. We do this with ever increasing scale and scope in terms of the number and variety respectively of different resources and combinations of resources used and the number and variety of differently skilled individuals involved. There are two primary co-ordination problems inherent in this system: technological co-ordination and incentive co-ordination.

6.2.1 Technological Co-ordination

The first co-ordination problem is that of determining how, where and when each resource (natural and human) must be employed to produce the 'optimum' efficiency of production. In fact even on this purely technological basis it is difficult to imagine how such a complex problem with so many unknown variables could have a determinate optimum, and indeed the pattern has been for powerful individuals (their power emanating perhaps from resource wealth, perhaps from power over individuals, perhaps from some insight of genius) to envisage a desired outcome of such production and by skill or by luck to hit upon a successful arrangement by which this can be achieved. As the scale and scope of production has expanded, the organizations these individuals have controlled have changed the way they are constructed (although the reality of control by individuals or small groups of individuals has not changed). This has occurred as the importance of these organisations to the external relationships of human life has become more prominent and more widely recognized by the general population through their governing institutions. This relationship between the local monopoly of force (the state, whether democratic or otherwise) and the individuals and/or groups of individuals organizing production has been formalized by the granting of limited liability, patent rights and other recognitions in exchange for the right of the

state to a share in production in the form of taxation, eventually giving rise to the modern entity of the firm.

The firm is the organisation responsible for the determination of the technological aspects of production. By encompassing the resources and individuals appropriate to a particular production aim within its aegis it can explore the technical possibilities in a directed and consistent way. Because the attributes of declining marginal productivity of labour and capital are frequently absent from the technological processes chosen, and because the market into which production output is offered is rarely of the perfectly competitive type envisaged in neoclassical models, the firm must itself determine for what its output is to be exchanged. Clearly the minimum return on the offering of its output should enable it to produce again; otherwise the firm has no long-term utility. The maximal return will in all probability be non-computable, depending on the complex adjustment of needs and desires among potential customers and the nature of technologies actually used and those potentially usable by the firm, although the firm itself is surely the entity best placed to reach an approximation. In any case whether the firm attempts to maximise its current return, its longer-term return, or indeed neither will depend on the subsidiary goals of its controllers (Eichner 1987).

6.2.2 Incentive Co-ordination

The second co-ordination problem faced by those wishing to combine resources and human skills in production of new goods and services, is that of incentive co-ordination. Assuming the existence of firms (although this too is subject to incentive issues), they do not in the modern world have automatic rights to resources and human labour. If they are not to seize these by force, then they must have something to offer in exchange. If the firm has been set up for the primary purpose of production, then before

the production process starts, it may have no output and so nothing to offer potential suppliers of capital goods or of labour. As the complexity of technology (and therefore the subjective uncertainty as regards to the value of output) and the time-scale of production increases, this becomes more of a problematic issue. Under these conditions the technologies that can be utilised by firms become limited, even when the resource co-ordination problems have been solved.

The problem of resource acquisition before production may well be an easier one to solve, than that of labour acquisition. The controllers of firms may well enjoy social relations with the controllers of natural resources good enough to be able to convince them that their investment in the firm is a prudent one (thus the existence of 'trade credit'). The problem of convincing individuals to give up some of their labour power to produce an output whose existence may appear to them uncertain (and possibly its utility more so) and some way off in the future, is likely to be much more difficult. Otherwise they can direct all of their labour power to maintaining the needs of themselves and of their families. Tokens that firms themselves might issue, guaranteeing to their labour providers a fixed quantity of the output that their labour is responsible for producing may help to convince them, but there are two limiting issues. Firstly the willingness of workers to accept these tokens depends on the trust these workers have in the firm, and since this is one of the issues in question this is not a secure ground for providing that guarantee. Secondly, the process of production is critically limited by the desire of workers for the output of production either for their own consumption, or for barter within their own milieu.

The issues described in the previous paragraph resulted in the rejection of the exchange-based explanations of money discussed in Chapter 2. It is not enough to have paper backed by individuals because even when the debt is multilateral in the sense that

the final creditor is not specified, it is not multilateral on the other side. It still depends on the ability of a *particular* individual to produce a saleable output. The nature of modern money is quite different from this, because the backing of modern money is divorced from any particular output or any particular demand for that output. This is what separates it from being simply a sophisticated form of barter. This is both its triumph, and we shall argue, its potential disaster.

6.2.3 Summarising What Money Is

The analysis of money cannot reveal any insight unless it is clear that we are conceptually separating the flow of money and the flow of real goods and services that *themselves,* without any other intermediation, produce utility to individuals, enhance utility to individuals, contribute to the production or consumption of goods and services or make the production of goods and services more efficient or effective. The most important feature of money that we must remember is its unreality and the fact that it has no tangible existence or intrinsic value, despite the presence of tangible money tokens. Without this feature of unreality money has no special power or significance; it would just be another commodity. Money itself provides no utility, makes no technology more efficient; it simply indicates a credit of goods to its receivers and a debit of goods to its issuers; credits and debits that are administered by the social institution of a bank. This is the definition of money that makes it uniquely important in terms of the effective demand present in the economy. The quantity in existence in deposits at any time is less important than the rate of flow, and where it is flowing. As Keynes makes clear, velocity is not a helpful concept because it lumps all flows and all static collections of money together (Keynes 1971[1930]).

It should also be apparent that a good of durability, portability, value and widespread demand such as gold may be a highly liquid asset, but it is very distinct

from the money of our study here. Gold's value is always linked to its intrinsic beauty and relative scarcity. These may often be difficult to justify rationally, but they are psychological phenomena linked to the substance itself. The famous POW camp cigarette economy existed because there were enough smokers who desired the cigarettes for themselves, and because the camp community was small enough for the calculation of an average demand (addicts tend to have a fairly stable need for the object of their addiction) (Radford 1945, Ingham 2004). Non-smokers could therefore know in advance what they could expect to barter them for. As Goldberg's research emphasises, and our discussion of the exchange models in Chapter 2 reveals, meaningful money cannot exist as a token valued only by convention (Goldberg 2005).[1]

Neither are other financial assets money. Bonds are not money; stock derivatives are not money; credit cards are not money. Bonds and derivatives may be exchanged in transactions, but the transactions do not involve the central tallying of generalised debits and credits. A bond is a specific debt that can only be repaid by the success of a particular commercial or state enterprise; its value stands or falls on the doings of that enterprise or that state. It is always tied to some observable aspect of the real economy. Financial assets always represent *inactive* purchasing power that cannot influence the real economy directly without being first converted into *active* purchasing power in the form of money.[2] By observing the flow of money into and out of such assets we have all the information we require.

Derivatives are tied in the same way – at one remove in time may be, but the area of the economy they are tied to is always specified. Credit cards are simply an

[1] There might appear to be a counter-argument based on 'rational bubbles' and conventional valuations, but these see great fluctuations, are only in small segments of the economy and always have a finite lifespan. These mechanisms cannot therefore explain a stable monetary system.

[2] Fluctuations in the subjective valuation of financial assets can of course have real economic consequences, through balance-sheet effects, but this just emphasises the distinction between them and money. Money held as an asset is never revalued.

extended authority to create credit on behalf of the holder. When the purchasing power created is matched by a debit with the card provider, they are simply a delegated and limited authority to create more *money*. [3]

6.2.4 Money and Mediation

We have argued that money is not simply some common good or token for a specific output that is exchanged because there is enough demand for the good to create a steady flow of the good or its token into and out of the economy. Money is a token which can be redeemed in any good and is issued by a third party whose role is to mediate between debtors and creditors, without being directly involved in production him or herself. The third party must therefore have two essential features. Firstly they must be able to record both the debts of the producers as assets and the credits of the suppliers of capital goods and labour as liabilities and to match them *in aggregate*. That is to say that they must perform some system of double-entry book-keeping (even if it is in the primitive form of tally-sticks and stubs (Wray 2003). And, secondly, they must wield some power over the debtors, whether this is through the peer pressure of a merchants' guild, the power of a local ruler or the enforcement processes of financial and contract law in the modern state. If such a third party exists (let's now call it a bank), then the chances of a contract developing between a firm and its suppliers of goods and labour may be much enhanced. These suppliers know that the enforcement powers behind the bank will ensure that they receive a portion of the firm's output and the bank's book-keeping means that all parties know exactly what that portion will be.

The great positive and negative powers of money and banking lie also in the generality of banks and money. Since the guarantees and trust are transferred away from the producers themselves, and the bank produces no specific real objects, the

[3] See also discussion of Features of Money in Chapter 1.

banking process need not distinguish between any output or any mode of production. Any firm may use the same bank, and since the essence of money is not in the particular output that it guarantees in a specific credit issue, but in the enforcement and information retaining power that the bank has access to, the money liabilities issued are not tied to any specific output. These liabilities are tied to all of the output produced by any of the firms who have debts with the bank. As a consequence the credits issued to firms' suppliers are credits to the output to any of the firms who have debits with that particular bank. In this way, the monetary issue of the banks allows the capital goods and labour suppliers of the various firms direct access to the output of all of the firms with debits to that bank, without the need to exchange their own labour or output directly in barter. The beneficial effect of money and banking is thus to vastly expand the scope of demand for possible new combinations of labour and resources, and so in turn to make their production and supply viable where it was not before.

6.3 The Costs of Money

6.3.1 Money and Information Loss

What makes money unique is the separation it creates between its holders (the creditors of the system) from the banks' borrowers (the debtors of the system). There need be no direct communication or information transfer between the borrowers and the creditors. The link that would otherwise exist between a firm and capital goods or labour supplier in a pre-monetary economy is therefore broken. To the extent that this link is limiting in the ways described above, this is a benefit. No one need know who the bank has originally lent specfic money to, or who is expected to return that money to the borrower. But surely the absence of information and communication cannot be wholly beneficial? Indeed it is not, and now we explain why it is not in the case of

money. Let us start by considering what suppliers of goods and labour will know about the firm they are supplying to, before the advent of multi-firm banking. They and the firm are relying on the direct utility value of the output to determine the benefit or otherwise of the production process (see the 'hostage' model in chapter 2). There is thus a strong incentive for all parties to calculate the real effects, positive and negative, of the output and the processes required to achieve it. At this stage decisions are not made on monetary values alone.

When the money economy is limited in scale, there remain alternatives to supplying labour to firms. Individuals have the option of applying their labour power to their own immediate desires, if the calculation of benefit from engaging in a monetary production process does not exceed this. As the monetary economy encompasses more and more of production and of the resources required for it, and the skills required for any degree of self-sufficiency become lost, this option is eroded so that the alternative too is lost. Individuals are no longer in a position to calculate the benefits of entering the production process, and indeed the necessity to so calculate *appears* to have been removed by the generality of money's purchasing power. The ubiquity of money's acceptance, in token form or in the direct manipulation of the banks' books by way of cheque, debit and credit card, means that for the individual and for the most of the time this is true. But while the link between the individual creditor and debtor can be dissolved in the mass of monetary transactions, the significant effects of the monetary system depend on its effect on the final real world of production and consumption, and the link between these in aggregate *cannot* be broken. What is produced has an effect when it is consumed, on humans and on the rest of the natural world, and if it is not consumed this has feedback effects on production. The process of production has an effect on the natural and human resources used to produce. Where these decisions, in a

non-monetary economy, are taken by individuals about their own inputs and processes contemporaneously, in a *monetary* economy the 'black box' of banking and money renders these and their effects largely invisible at their time of application. These effects may be revealed only when irreversible consequences have resulted. As we have shown in Chapter 5, contrary to the assumptions of Walrasian models the economy and society are not in a timeless equilibrium, but are path-dependent. If we do not pay close attention to the path we desire to follow, we may stray off it perhaps never to find it again.

6.3.2 Money and Risk

The use of money appears to play an important part in reducing the exposure of individual transactions to risk. In the case of money issued in a credit contract, the risk to suppliers of capital goods and labour that they may not get their promised share of the output of the firm to which they supply is apparently removed by their acceptance of general purchasing power. In the event of the firm failing to produce the planned output, because their money holdings are 'bundled' liabilities, they still have value in the form of their validity for the purchase of goods and services produced by other firms within the monetary economy. There is also a reduction in risk for pure exchange transactions.

It is important however, to be clear that the real world risk that existed before these monetary operations remains. The point of impact of this risk has simply been adjusted. We must not assume that because individuals perceive a local improvement in their risk profile as a result of the translation of economic operations into monetary transactions, that this benefit is a real one to hold at all times. The Keynesian analysis of uncertainty shows us that risk is not so easily eliminated. As the benefits of insurance depend on the risk-aversion of the insured, the benefits of monetary

transactions depend on the attitude to adverse events of those involved. And this attitude may or not be appropriate depending on the information available to transactors. A severe enough event will sweep away the insurance company too, resulting in the loss of premiums and with no benefits payable to the insured. In this case the insured are worse off than they would have been with no insurance. Ignorance of the possibility of such a catastrophe will result in a false assessment of the risks and benefits of insurance. Given that we have argued in the previous section that a monetary economy involves the existence of a loss of information and communication between debtors and creditors, the very existence of a monetary economy may distort the perceived risk-benefit profile of transactions and create risks that exceed the generally calculable ones dealt with by insurance.

What are the new risks present in a monetary economy that are not present in a non-monetary system? As we have made clear in Chapter 4 the purchasing power of money is issued by banks in the expectation of either the purchase of goods and services yet to be produced (production loans), labour that is yet to be expended (household loans) or efficiency/information gains from change of asset ownership (speculative loans). All of these gains are to be made at the margin: for production loans the difference between the value of inputs and their combination; for household loans the difference between the utility of consumption now and the utility of consumption later and for speculative loans the difference between asset performance in one set of hands and that in another. The cost-benefit differential in each case is therefore sensitive to relatively small changes in value of the anticipated end-point of each triangular contract. Failures of expectation may come about because of unexpected ‘external’ events – events that affect the production or utilisation of the ‘final good’ or unexpected ‘internal’ events – events producing a change in demand

from the prospective consumer. As long as these cancel out, there is no systemic problem, but the tendency to conventional behaviour can lead to aggregate swings. We model and analyse this problem in the next section.

6.4 Expectations Failure in a Stock-Flow Consistent Model

We shall set up a Stock Flow Consistent Framework and analyse the effects of failed expectations within the triangular contract. Since the purchasing power issued in a production contract has been assigned a fixed value in the money of account, the effects of a failure of expectations will be reflected in a mismatch between real value and monetary value. We will distinguish between a reduced *quantity* of output and reduced *quality* of output. Both represent a reduction in benefit in relation to expectations but a reduced quantity of otherwise satisfactory output is usually obvious and needs an explicit price rise by the firm to recoup revenue.[4] A reduced quality of output may well be less obvious to consumers; to the extent that it is it will not command the expected price per unit of output, or will not be sold at all.

The model is based on the 'Simple Model with Private Bank Money' that we analysed in the last chapter (Godley and Lavoie 2007, pp217-249) with the innovation of the division of production firms into three sectors, two consumer goods firms sectors and an investment goods sector. The firms' counterpart in the transactions flow matrix to the consumption of households is explicitly a function of the price and quantity of output sold. This allows us to trace the effects mediated through other firms and their output when one sector suffers from unfulfilled expectations. **Table 6.1** is the Balance Sheet for this economy and **Table 6.2** is the Transaction Flow Matrix.

[4] See discussion of production in Chapter 1.

6.4.1 Households

Wage-earning households are distinguished between those that are employed by sector 1 or sector 2 consumer goods firms, by investment goods firms or by banks. We have assumed that households have the option of consuming their wage income or of saving it either in the form of bonds they can purchase from consumer goods firms or in the form of money deposits held with the banks. In this model there is no explicit household borrowing although we will discuss the importance of this later. The general household budget constraint for each discrete period we analyse in the model is derived from the transactions matrix and is

$$wE = C + \Delta BH + \Delta M \,, \tag{6.1}$$

where w is a standard wage, E the level of employment in terms of an effort and skill adjusted unit of labour, C is consumption, BH the monetary value of bond holdings and M nominal money holdings. This budget constraint always holds in each period, both in aggregate and for each employment sector, with the subscript *1* indicating households employed by consumption goods sector 1, the subscript *2* indicating households employed by consumption goods sector 2, subscript K indicating households employed by the investment goods sector and subscript B households employed by the banking sector.

6.4.2 Firms

The production process is assumed to start with a bank loan for the process of meeting the wage bill, or that part of it that must be met before a revenue flow is established. Both consumer goods and investment goods firms must borrow before production starts. This must be true in aggregate since loans are the source of all money in the model, and therefore any retained money by one firm must represent outstanding debt for another.

Profit and investment in the model can be interpreted either as revenue over costs that is spent in the same period, which implies that the period in the model represents an investment cycle or in the Kaleckian sense that investment expenditure is returned as profit. In any case profit investment and investment are equivalent flows in each period (Kalecki 1971).

Consumer Goods Sector

For the consumer goods firms sector, revenue comes from sales to households, and costs consist of the wage bill of the relevant sector and interest payments on loans incurred in this period and those outstanding from previous periods. The difference between revenue and costs shows up as profit or loss for that period. If a profit is made, this is assumed either to offset any outstanding loan and/or used to purchase investment goods from the investment goods sector. If a loss is made, this can in part be offset by the sale of bonds to households of all sectors, so that the addition to the loan is limited. To avoid complications it has been assumed in the model that these bonds do not earn any return for their holders, but clearly in the real world there must be a positive incentive to hold them on the part of households and some cost to firms in issuing them. If despite the sale of bonds firms still fail to earn enough revenue to repay their current production loans, then the difference is added to their total outstanding loans. Thus the period budget constraint for consumer goods firms in sector 1 is

$$F_1 = p_1.Q_1 - w.E_1 - R_1.L_1 - r_L.w.E_1 . \tag{6.2}$$

where p_1 is the price charged for each unit of their output, Q_1 the number of output units sold, R_1 the aggregated interest liability on outstanding loans L_1, r_L the current loan interest charged by the banks and F_1 the current profit for the period. The current budget constraint for firms in sector 2 is then simply

$$F_2 = p_2.Q_2 - w.E_2 - R_2.L_2 - r_L.w.E_2 . \tag{6.3}$$

The changes in loan position at the end of the period for consumer goods sectors 1 and 2 are respectively given by

$$\Delta L_1 = p_K K_1 - F_1 - \Delta B_1 , \tag{6.4}$$

and

$$\Delta L_2 = p_K K_2 - F_2 - \Delta B_2 , \tag{6.5}$$

where if $F_1 \leq 0$, then $p_K K_1 = 0$; and if $F_2 \leq 0$, then $p_K K_2 = 0$. K_1 and K_2 are the purchases of investment goods and ΔB_1 and ΔB_2 are the new Bond issues for consumer goods sectors 1 and 2 respectively. The price of investment goods is p_K. Ignoring asset price fluctuations, investment spending builds up fixed capital in the consumer goods sectors according to

$$\Delta FK_1 = p_K K_1 , \tag{6.6}$$

and

$$\Delta FK_2 = p_K K_2 . \tag{6.7}$$

Investment Goods Sector

To simplify the model we have assumed that the Investment Goods sector pays no interest on its production loans and always breaks even, making neither profit nor loss. Thus its budget constraint is simply

$$wE_K = p_K K , \tag{6.8}$$

where K is the total sales of investment goods to the consumer goods sector.

Banking Sector

Finally we model the banking sector as having the current budget constraint

$$wE_B = R_1.L_1 + R_2.L_2 + r_L.w.E_1 + r_L.w.E_2\,, \tag{6.9}$$

and a balance sheet constraint

$$\Delta M = \Delta L\,. \tag{6.10}$$

The only other consistent assumptions we make in the model are that the level of employment in each sector does not react perversely to a change in the wage level, so that

$$E = E(w), \quad E'(w) \geq 0\,, \text{ for all } E;$$

and that the sale of goods in each sector does not react perversely to a change in price, so that

$$Q = Q(p), \quad Q'(p) \leq 0\,, \text{ for all } Q \text{ and all } p,$$

and

$$K = K(p), \quad K'(p) \leq 0\,.$$

6.4.3 Quantitative Failure of Output Expectations

We can easily show the effects of realised output sales that are less than that expected when sector 1's triangular production contract is made. Sales may be lower than expected either because the output technology was not as efficient as expected, or because the good was not as desirable as expected. It is our claim that the nature of the information deficit that arises in a monetary economy makes this more likely. We derive expressions for expected and actual output from sector 1. Expected output is given by

$$Q_1^E = \frac{wE - \Delta BH^E - \Delta M^E - p_2^E Q_2}{p_1^E}\,, \tag{6.11}$$

and actual (realised) output by

$$Q_1^R = \frac{wE - \Delta BH^R - \Delta M^R - p_2^R Q_2}{p_1^R} . \tag{6.12}$$

The wage rate *w*, skill-adjusted effort *E*, and Sector 2 output Q_2 are given and constant; but aggregate bond holding *BH*, aggregate deposits *M* and the prices of Sector 1 and sector 2 output, p_1 and p_2 respectively may adjust so that equation 6.12 holds.

If realised output is less than expected output, then

$Q_1^R < Q_1^E$

which implies either

$p_1^R > p_1^E$; or

$p_2^R > p_2^E$; or

$\Delta M^R > \Delta M^E$; or

$\Delta BH^R > \Delta BH^E$

or some combination of these.

The overall price level is determined by a weighted consumer price index calculated according to

$$p_i = \frac{p_1 Q_1 + p_2 Q_2}{Q_1 + Q_2} , \tag{6.13}$$

which implies that the price level will rise if there is a proportional increase in total revenue greater than the proportional increase in total output.

We will analyse each possible adjustment route in turn.

A rise in the price of Sector 1 goods ($p_1^R > p_1^E$)

If the demand for Sector 1 goods is price inelastic, then the sector may be able to recoup most of its needed revenue by increasing the price of its output. If the sector can

increase its price to the level at which expected revenue is still received, then there need be no change in any of the other variables. Thus Sector 2 prices and revenue are unchanged. Sector 1 firms can earn their expected profits (if any) and repay their loans as anticipated. The banks earn their interest and see no loan defaults.

Since the wage bill of Sector 1 firms was anticipated to be (at least) wholly recouped in sales, and the value of output Q_1^E and its anticipated price p_1^E set in the production contract will price wages in line with the expected return from wages of goods already produced, no effective rise in the weighted price index (Eq 6.11) was expected.[5] In the situation where $p_1^R > p_1^E$, even if p_1^R is high enough to result in the Sector 1 revenue being what was anticipated, Q_1 is still lower than it would have been if expectations had been fulfilled, and so there is a rise in the weighted price index. Under this scenario, then, the failed expectations have been overtly inflationary. The real wage w/p_i falls.

A rise in the price of Sector 2 Goods ($p_2^R > p_2^E$)

In reality it is unlikely that Sector 1 firms can push the price of their output up to the level required to wholly recoup their expected revenue. If they could maintain the quantity demanded at this new higher price, it is likely that the original price set in the production contract would have been higher. Thus the effect of attempting to recoup revenue by raising p_1 is likely to be the substitution by households of goods and services produced by sector 2. The increased demand for these goods is likely to see an increased price for these goods. The increase in p_2 is also reflected in a rise in the price index p_i and a resultant fall in the real wage w/p_i. To the extent that Sector 1 firms fail to realise their anticipated revenue they may fall short of the final finance to repay their bank debts. Given the sector 1 budget constraint (Eq 6.2) they would then be dependent

[5] This is the effect predicted by the Real Bills Doctrine (see Chapter 4).

on increasing their issue of bonds to households *or* increasing their level of bank loans. The former would be likely to require an increase in the return offered on securities. The latter assume the ability to repay these loans in the future. In other words the firm must now anticipate future revenue in excess of expectations to repay its debts. For sector 2 firms nominal profits would rise, and these firms *may* interpret this as evidence of expectations on their part that had been too low, rather than failed expectations in sector 1.

If firms of sector 1 are unable to maintain their position by cutting their losses in exchange for persistent debt in this way, they must default on loans. As we have described in chapter 3 the consequence of a loan default should be the writing off of the equivalent quantity of capital from the bank's assets. As a consequence of this, the quantity of money available in the economy should eventually come to match the quantity of goods and services available for purchase at the prices expected at the time of the production contract. Direct inflationary pressures are then relieved. In this case it is the bank that is punished for the failure to anticipate demand correctly. We have not explicitly shown this in the transactions flow matrix but a negative value for ΔL in the banks capital column represents a balance sheet anomaly that the banks must correct.

An Increase in the Money holdings of Households ($\Delta M^R > \Delta M^E$)

If sector 1 goods are in short supply or are not demanded as anticipated, but the goods of sector 2 are not adequate substitutes, then households may opt to hold part of their wage income as money deposits, for better expenditure options in future periods. sector 1 income held in this way does not play any part in changing prices, and therefore does not have inflationary effects. The firms of sector 1 are however impaired in their ability to earn profits for investment or to repay their production loans at the

end of this period and as in the above scenario may become dependent on attracting securities holdings from households or increasing their loans with the banks.

An Increase in Bond Holdings ($\Delta BH^R > \Delta BH^E$)

Where households see no immediately attractive option for expenditure, and do not feel the need to add to their immediately available money deposits, they may be willing to purchase long-term securities issued by firms whose failed expectations have left them short of 'final finance' (Graziani 2003). This has no effect on prices and is a non-inflationary result of failed expectations. Moreover it protects firms from being unable to repay their bank loans.

6.4.4 Qualitative Failure of Output Expectations

By qualitative expectations failure we mean that although the quantity of goods produced by the firms in consumer goods sector 1 is as expected and sales are as expected, their actual real benefits are for some reason less than anticipated. This is less amenable to analysis than the quantitative story, but is still important. Households might find themselves suffering from these expectation failures after purchasing goods, because they did not have adequate information before doing so, or because after the triangular contract is completed they do not have a satisfactory alternative use of their purchasing power. The consequence is that there has been a real reduction in the value of this purchasing power and in their real wage that does not show up in the current price index or in firms' current loan defaults. However it may well have effects that are propagated into subsequent production contracts. Again, we argue that the separation between the creation of money in one production contract and its destruction almost always in a different production contract leads to information deficits that make qualitative expectations failure very likely.

6.4.5 Cost-push Inflation

When the demand for commodities increases in relation to their supply their prices rise. These price rises filter through to the prices of manufactured goods to the extent that these commodities are required capital goods in production. By combining equations 6.1 and 6.2 we obtain an expression relating the price of Sector 1 consumer goods to Sector 1 firms' costs:

$$p_1 = \frac{wE_1 + R_1.L_1 + r_1.w.E_1 + F_1}{Q_1}. \tag{6.14}$$

The important difference between this equation and the realised quantity equation 6.12 is that this equation is one that should be apparent *before* expectations are realised. In other words it is known at the time that the production contract is created. If Sector 1 firms suffer from reduced productivity of their capital from one period to the next, (which can be represented in an increase in the amount of labour E_1 they need to hire to produce output Q_1) then their wage bill must increase to produce the same output. Assuming fixed interest rates, to maintain their current budget constraint Sector 1 firms must either reduce their anticipated profit or increase the price they plan to charge for their output. Their choice is likely to depend on the relative elasticities of the labour market. An inelastic labour market may allow a reduction in the wage rate; otherwise workers may seek employment with firms in the other sectors. An inelastic product market may allow an increase in prices to raise revenue toward that required to match the new level of costs. To the extent that either are possible there is a fall in the value of the real wage, but only an increase in prices will bring about an overt increase in inflation. Note that there is an incentive for workers to collude with firms in preferring a price rise to a fall in wages, since the real wage fall that results is distributed throughout the whole of the economy rather than being concentrated in Sector 1.

When inflation occurs as a result of recognised rises in costs, there is no unexpected mismatch between money and real output. Any loss of value of money is built into a production contract with the recognition that the rise in production costs is responsible for a fall in the real wage. It is therefore important to distinguish between these phenomena. Cost-driven price rises can be anticipated and often offset at an early stage. They are therefore much less likely to give rise to the problems seen as a result of failed expectations.

6.4.6 Propagated Expectation Effects

The process of new production contracts is a constant, indeed more or less seamless one, and so the outcome of one production cycle leads into the next one and overlaps with many others. How to define an individual 'contract' is clearly an impossible task, but it is clear that over time there is a connection between the realisation or otherwise of expectations and subsequent expectation formation.

Depending on the expected marginal benefit from the labour or capital goods contract, households may lose out from inflationary changes in price levels that result from quantitative expectations failures, or from qualitative expectations failures, both of which reduce the real wage w/p. If so the effects of this will be felt in the next cycle when these individuals may demand a higher money wage to enter into a new production contract. How much more cautious they will be may depend on the degree of net loss and psychological factors and so will in general be unquantifiable until the effect manifests itself in the next round of production contracts. There may be a positive feedback effect in the upward repricing of wages and goods.

When firms' revenue expectations are disappointed because output is less than expected or they cannot get the anticipated price for their goods, they may have reduced

profit for investment, problems in repaying their bank debts, and may even have problems in paying interest on their debts. The consequence may be that firms' plan a more conservative approach for the next period. This may take the form of cutting back on production (lowering E_1), reducing investment (lowering K_1) and/or attempting to squeeze workers or investment goods suppliers to reduce costs for the same level of output (lowering w or p_K).

If a failed revenue expectation results in a firm defaulting on a loan, the issuing bank's assets are reduced and interest payments fail to materialise. The bank must lose some of its capital to re-order its balance sheet.

6.4.7 Inflationary Lags

With a quantitative expectational failure, demand for a firms' output does not materialise after money has been borrowed and paid out to capital goods suppliers and workers. Since it takes a non-negligible amount of time to realise and to accept that such an expectation failure has materialised, the mismatch between effective demand in the form of money consumers wish to spend and the quantity of goods and services available to purchase may persist at a high level for some time.

In other words it may be some time before firms are willing to accept that they are not going to sell their goods at the price they had expected to do so to achieve their projected revenue. While these goods and services remain unsold, alternative goods and services are being purchased at higher than anticipated prices and so the general price level rises. The longer it takes Sector 1 firms to reduce their prices the higher prices of Sector 2 goods may rise. This general rise in prices may well mean that Sector 1 firms can recoup more of its anticipated revenue than might otherwise have been the case as a result of confusion between general and relative price rises. In the case where a

proportion of a firm's output remains persistently unsaleable to the extent that the firm must default on its loan, there is greater inflationary pressure – resulting in even greater labour devaluation.

6.4.8 Aggregate Effects

Were economic agents atomistic and unconnected there is no reason to suppose that expectations should be disappointed more often than they are exceeded, so that over any period the effects of disappointed and exceeded expectations would cancel each other out. It is clear that in practice there are cycles of aggregate increasing and reducing prices and of aggregate increasing and reducing activity encompassed by the monetary economy, on a background trend of increase in both. We can explain the tendency to cycles by the way the results of expectations impact upon successive periods, and the tendency for expectations to be 'conventional' (Keynes 1964[1936], Dow 2003). The secular trend in both monetary economic activity and in prices suggests, moreover, that there is a tendency to spend on other goods when households expectations are disappointed rather than to hold onto money in the hope of seeing the price of unsold stocks fall.

The tendency for consumers to spend when their expectations are disappointed, and thus 'collude' in the devaluation of their labour, may be as a result of needing to spend on essential goods, excessive positive time discounting or due to lack of foresight. The first relates to the extent that the monetary economy has encompassed the production of necessities such as food, energy and housing, the second and third may well relate to the problem that individuals have in linking their inputs with the outputs of firms. They may be aware that the goods they hoped for at the prices they anticipated are not available or do not match up to their expectations, but in the multilateral web of credits and debts hidden by the monetary economy, there is little

chance of understanding why this has arisen. Their only chance of rectifying their situation is to attempt to increase their monetary wage in the next production contract. Yet the reality may be that the firm was guilty of miscalculating the efficiency of its technology, or of overselling its output. The divorced relationship allowed by the monetary economy means that it is unlikely that workers have the motivation or the ability to check this within their own firm before output is produced. Yet, unless it is the miscalculating firm that bears the brunt of the expectational failure, the incentive to correct expectations may remain absent for the next cycle.

The market power of firms means that when workers seek to rectify a temporary devaluing of their labour resulting from failed expectations in the monetary economy by demanding a higher monetary recompense, firms can often anticipate raising the monetary price of their output to bring their anticipated revenue in line with their costs. If the miscalculation is so great that the firm has to default on its debt, then the bank that advanced the production loan has failed in its contract with the suppliers of labour and capital goods, and it is efficient that the bank is incentivised by the loss of part of its capital base to reappraise its lending strategy.

6.4.9 Distributional Effects

In summary, there is no reason why the existence of money should *in itself* result in the failure of the economy to adjust appropriately to incorrect or changed expectations. The problems of the monetary economy lie in the information and communication gap that results from the devolving of credit and debit matching to the banking system. The monetary system evolved as a system to provide reassurance to the parties entering a 'production' contract. The superb qualities of money as a medium of exchange, once created in the production contract, had a positive feedback effect on the development of the monetary system, to the extent that we have become blinded to

the problems that the system sweeps so effectively under the carpet. These problems do not go away however – they resurface away from the level of the individual and at the systemic level, to produce problems that do not exist in a non-monetary economy. The ability to act on expectations on a large scale that the monetary system allows means that when those are unrealised, this failure is on a large scale. Such large-scale failures can have large-scale consequences. There are the problems of firm failure and bank failure. These are intrinsic to any monetary system and must be managed. There is also the problem of inflation. As we have argued in Chapter 4, inflation is not intrinsic to a monetary system but it is a regularly observed feature of monetary economies. When inflation is overtly expressed in the price level, and affects all participants in the economy to a greater or lesser extent, collective action is not generally in dispute.

Our analysis has indicated that when there are *qualitative* expectational failures, inflation need not be overt in that the real value that money wages can purchase may fall even if the price level is stable. The section of the economy that is responsible for expectational failure may not bear the brunt of it. If the economy is to adjust efficiently and effectively it is critical that the cost of expectational failure falls on those actors in the economy whose expectations were at fault and must be corrected. Here there are very clear sectional interests, and the scope for collective agreement is much more troublesome.

6.5 Consequences and Remedies

6.5.1 Money and Utility

We have argued in the previous sections that when we set up the relations between the monetary and the real economy in this way, the separation between debtors and creditors in the modern money and banking system results in a tendency to the

mismatch of the issue of credit-money and real output as a result of failed expectations. In particular, the parties to production processes, whether controllers of firms, employees of the firms or suppliers of capital goods to the firms do not see their welfare in terms of the real utility value of the output of the firm but in their anticipated share of the monetary revenue of the firm. And since the firm can back up its expectations (on condition of convincing a bank that it can repay any loan) with purchasing power in the form of money, no further guarantee is looked for. Once expectations have failed, the production process is irreversible and all parties suffer to varying extents that are frequently not related to the part they have played in failing to anticipate outcomes correctly. Aggregate human psychology frequently plays a part in waves of negative and positive expectation mismatches, and the consequent waves of inflation and reduced economic activity that have little or any relationship with the current state of human technology or the organisational ability to harness it fruitfully.

As we write this we are seeing the outcome of a major episode of the mismatching of money issued in the form of credit to purchase financial assets (assets based on the ability of someone else to provide an income stream or a higher sum of money some time in the future) of unascertained (frequently close to zero) real value. The problem seems to be that it has been ignored that the only *final* way to recoup money that has been borrowed and then spent is to produce something that somebody wants to buy for the purpose of enhancing their welfare. It seems that too few of the complicated financial transactions of recent decades have managed to produce this. Securitised mortgage contracts have not enhanced the welfare of those unable to obtain the earning power ever to repay them, complicated debt insurance arrangements have failed to ensure the assets of pension funds maintain their value because the riskiness of these assets could not just be made to disappear. Such problems have been exacerbated

by the process of financialisation we referred to in Chapter 1 (Stockhammer 2007, Palley 2007). What options for monetary policy are suggested by our analysis of the systemic problems of a modern economy?

6.5.2 The Current State of Monetary Policy

Day to day economic policy for many developed countries consists of specific inflation targeting; for those where it does not, it seems that that the rate of inflation remains the over-riding target for policy (Rochon and Rossi 2006). Generally the main instrument of policy is limited to a short-term interest rate. Despite apparent success in keeping inflation at low and stable levels in those countries where inflation targeting is the policy of choice (explicitly or implicitly), there is little evidence that the anticipated benefits in terms of increased growth and a more even distribution of income has been seen.[6] There has been slow growth, poor employment generation and little evidence in a reduction in the sacrifice ratio (the unemployment cost of reducing inflation). The main consequence seems to have been wealth accruing to rentiers as a result of high real interest rates (Epstein 2003).

As we have argued in Chapter 4, interest rates are neither the cost of capital nor recompense for purchasing power foregone. In a competitive lending environment interest rates are determined by the costs of issuing loans. These costs are primarily enforcement, administrative, and default costs. For commercial banks, much of the enforcement costs are passed on to the state and are paid for by the banks in the form of the interest they must pay to acquire the base money they require for their day-to-day operations. By adjusting their part of the costs of commercial banks the state therefore has some leverage over the cost-benefit calculations they make in their lending

[6] In fact even the role of inflation targeting in reducing inflation can be questioned (Rochon and Rossi 2006)

decisions. If the state increases the costs of commercial banks lending activities by raising the lending rate of its central bank, then *ceteris paribus* such activities can be expected to decrease, and if the state decreases these costs *ceteris paribus* they can be expected to increase.

It is important to begin by noting a conflict between the desire of the state to use the interest rate of the central bank to influence the level of commercial bank loans offered, and the degree to which the price charged by the state to the banking sector for its role in the enforcement of lending contracts is a fair one. If the price of loans is too high, marginally profitable economic activity is reduced. If the price is too low then ultimately tax payments or a running down of the state must compensate, and there is a moral hazard effect. If the cost to the commercial banks of lending is set too low, then this need not in itself lead to excessive loans with resultant increased level of failed expectations and the consequences described above, but the moral hazard is that the higher mark-up made possible by lower-than-warranted costs will lead banks to discount the possibility of failed expectations to a greater than desirable extent. Thus the importance, given that governments are attempting to use interest rates to offset some of the inevitable consequences of the existence of money and banking, of attempting to find the right central bank rate of interest. But of course the monetary economy is opaque for the state also, and they too, even if they know where the problems of failed expectations have arisen are unable to do anything other than bring about a blanket increase in costs for the banking sector that will be transferred to other sectors depending on their market power in various areas of the economy. Central bank interest rates are thus a very blunt, inaccurate and often poorly-timed corrective for excessive (or indeed excessively weak) expectations. In the next section we shall

consider some alternative interventions for addressing the shifted problems of the monetary economy.

Using our SFC model in this chapter we can trace the possible effects of interest rate policy, using the sector budget constraints (Equations 6.2 and 6.3). Under circumstances where expectations failure leads to an inflationary outcome – Sector 1 and or Sector 2 prices rise and effective Sector 1 output falls, so that the price index (Eq 6.13) increases - the monetary authority will raise the interest rate for the acquisition of base money by the banks. Although this is not specifically modelled, we assume that the current interest rate r charged to consumer goods firms increases. This means that all firms (irrespective of the outcome of their expectations in the previous period) face a higher interest rate burden in the next. For Sector 1 firms, whose revenue was less than anticipated, this comes on top of an increased outstanding loan and interest burden. Depending on the nature of their production function and the anticipated elasticity of their demand all firms may seek to reduce their investment K_1, their labour force E_1 or raise the price of their output p_1 or some or all of these. The rise in loan interest rates may lead to a rise in the returns to deposits and securities (not modelled explicitly here), that further inhibits economic activity by reducing households' propensity to consume. Again this will reduce the revenue of firms in both Sector 1, whose expectations in the last period were not achieved and that of firms in Sector 2, whose were. Moreover, the adjustment of interest rates does nothing to affect the pre-existing money to demanded output mismatch that led to the rise in prices. Only future over-expectation by firms (made less likely by the higher rates) can achieve this.

In the case where failed output expectations do not lead to a rise in the price index, because money not spent on Sector 1 output is held as deposits, then prices do not rise but firms fall short of the revenue required to meet their profit or debt targets.

In some cases they may default, damaging banks balance sheets. The likely consequence is an unwillingness to plan future output with subsequent reduced employment levels. The only remedy for the monetary authority is to reduce interest rates in the hope that the subsequent reduction in costs will encourage firms to make positive plans ahead once more. A concomitant fall in the rates of return paid to deposit and bond-holders may increase the propensity to consume, with a subsequent rise in the price index. Again the interest rate does nothing to actually correct the money-output mismatch.

In conclusion, interest rate policy is a clumsy after-the-fact instrument that can do nothing to improve the success of expectations, and is likely to cause as much worsening as amelioration of the consequences of their failure.

6.5.3 Alternative Monetary Policy Options

The problem with a monetary and banking system of the type we have in modern economies is that meaningful links between the suppliers of resources, in particular suppliers of labour, the firms that they supply to and the ultimate consumers of the goods and services that these firms produce are absent. The link is lost across the balance sheets of banks as debtors and creditors are ‘matched’ in ever more complex ways. In fact it has recently become clear that as financial institutions attempt to escape from the limitations of the credit-money circuit, which insist that money lent must ultimately return to the lender of issue if the system is to sustain itself, that much of this matching on their balance sheets has been little more than fantasy. While their liabilities have been real enough, the valuation of assets has far exceeded the purchasing power that will ever be employed to purchase them. As long as these assets were purchased for selling, as their prices spiralled upwards, the process continued. As soon as anyone wondered what they might really be worth if they were left holding

them when the music stopped, their value collapsed and the balance sheets of the institutions holding them developed gaping holes where collateral for further liquidity used to be (Wray 2008, Tymoigne and Wray 2008).

If manipulation of the interest rate at which commercial banks can obtain the reserves they require for their day to day operations, and targeting this manipulation on a price index inflation target can neither produce stable behaviour of the economy, nor maintain the desired level of growth and employment it is clearly time to look elsewhere for economic policy levers. The aim of policy should be to shift incentives to minimise expectational failures and improve the transparency of the debt-credit nexus.

One option might be a 'Real Targeting Framework' which instead of aiming for a monetary variable such as the inflation rate would be targeted on selected economic variables more directly associated with social welfare This might include tools such as credit allocation policies, support for development banks and development lending, price-based regulatory incentives. Perhaps the most crucial proposal, in the light of our analysis of the problems of a monetary system that hides debtors from creditors, is that to institutionalise citizens and labour groups into central bank decision making. An important role of the latter would be to provide some public education as to what actually goes on in the 'black box' of money and banking, and how it can be influenced (Epstein 2003).

Price-based regulatory incentives could have the merit of pushing production contracts toward more welfare-producing output while allowing those making production contracts (in the broad definition) to follow their own information and incentives in determining the details of these contracts. One important suggestion in this area is that of Asset-Based Reserve Requirements (Palley 2003, 2004, 2006). The primary motivation for such a form of regulation is that in the present era, the primary

risk to financial institutions is not on their liability side but on their asset side. The presence of state deposit insurance and liquidity support for commercial banks means that mass withdrawals of deposits is now far less of a risk than that of the collapse in value of assets. While this has been addressed in part in recent times by the imposition of capital requirements for banks based on the riskiness of their assets, these requirements may have markedly procyclical effects.

> Banks are forced to look for additional capital in recessions when loan quality deteriorates and default risk increases, yet this is exactly when bank capital is hardest to raise (Palley 2004, p47).

By tailoring reserve requirements to particular types of loans and securities that banks hold on the asset side of their balance sheets monetary authorities can influence both the riskiness and the contribution to welfare of loans and other debt assets acquired by institutions, without themselves directing their activities.[7] And when loans deteriorate or default, as their asset value decreases, the reserves required to be held against these loans actually decreases, freeing up these reserves for new (and hopefully more successful) lending. The injection of reserves by the central bank can have a more direct stimulant effect under such rules. By applying these rules to all intermediaries, whether they are nominally banks, insurance companies or mutual funds, the focus is shifted to the legal definition of the type of business, but to the functional form of the asset held. There is thus no benefit for category-shifting of businesses (Palley 2004).

6.6 Conclusion

In this final chapter we have summarised our picture of monetary flows as arising from triangular relationships between banks (commercial and central), firms and households in the process of creating additional value from inputs, when time and

[7] Clearly, for this to work will require much tightening of what is allowed to be off the balance-sheets of financial institutions.

uncertainty are a potential barrier. By analysing these flows according to strict double-entry book-keeping, rigorously matching monetary assets and liabilities, we identify a structure to the monetary economy far more robust than those of economic models that rely either on behavioural axioms or empirical behavioural relationships.

Using this structure we analyse the unique problems that a monetary economy raises, because of the evolution of the triangular relationship of money creation from the simple team-production/hostage contracting of a single firm in Chapter 2, to the creation, acceptance and valuation of money on a systemic basis that is analysed in Chapters 3-5. The consequent dispersion of information means that monetary flows and the benefits of production are frequently mismatched, with the result that expectations formed within the multiple triangular relationships of the modern economy are frequently unrealised.

Finally, we briefly discussed the role of policy in minimising the problems of a monetary economic system, using our monetary flow structure to assess both current monetary policy and alternatives.

Table 6.1 Balance Sheet

	Households	Consumer Goods Firms		Investment Goods Firms	Banks	∑
		Sector 1	Sector 2			
Money Deposits	$+M$				$-M$	0
Loans		$-L_1$	$-L_2$		$+L$	0
Bonds	$+BH$	$-B_1$	$-B_2$			0
Fixed Capital		$+FK_1$	$+FK_2$			$+FK$
Balance (Net worth)	$-V_h$	$-V_1$	$-V_2$	0	0	$-FK$
∑	0	0	0	0	0	0

Table 6.2 Transactions Flow Matrix

	Employed Households				**Firms**					**Banks**		
	Cons Gds Fs		Inv Gds Fs	Banks	Cons Gds Fs				Inv Gds Fs	Current	Capital	0
					Sector 1		Sector 2					
	Sector 1	Sector 2			Current	Capital	Current	Capital				
Consumption	$-C_1$	$-C_2$	$-C_K$	$-C_B$	$+p_1Q_1$		$+p_2Q_2$					0
Wages	$+wE_1$	$+wE_2$	$+wE_K$	$+wE_B$	$-wE_1$		$-wE_2$		$-wE_K$	$-wE_B$		0
Interest on Loans					$-(R_1L_1 + r_L.W_1)$		$-(R_2L_2 + r_L.W_2)$			$+R_1L_1 + r_L.W_1$ $+ R_2L_2 + r_L.W_2$		0
Issue of Bonds	$-\Delta BH_1$	$-\Delta BH_2$	$-\Delta BH_K$	$-\Delta BH_B$		$+\Delta B_1$		$+\Delta B_2$				0
Investment						$-p_KK_1$		$-p_KK_2$	$+p_KK$			0
Profit/Loss					$-F_1$	$+F_1$	$-F_2$	$-F_2$				0
Δ in loans						$+\Delta L_1$		$+\Delta L_2$			$+\Delta L$	0
Δ in deposits	$-\Delta M_1$	$-\Delta M_2$	$-\Delta M_K$	$-\Delta M_B$							$+\Delta M$	0
∑	0	0	0	0	0	0	0	0	0	0	0	

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