Finance in the Theory of Business Cycles

Indrajit, Mallick

Centre for Studies in Social Sciences Calcutta

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Indrajit Mallick

Centre for Studies in Social Sciences Calcutta

Address for Correspondence

8A Dover Road

Kolkata 700019

India

Email Address: imallick3@hotmail.com

Abstract

The question of aggregate welfare over time makes business cycle studies important. Finance studies allocation of resources under uncertainty. Thus both these fields of study dwell on intertemporal resource allocation under uncertainty. This paper attempts to shed light on how finance can be integrated into business cycle theory to provide richer and deeper insights than the standard real business cycle theory.

JEL Classification: E32, E44, G

Section 1. Introduction

Fluctuations in aggregate economic activity have accompanied market economies throughout history. The recessions have been severely disruptive in many cases causing widespread unemployment, and have slowed down the long run capital accumulation process by hurting demand conditions, and the profitability expectations of the firms. Neither the labourer, not the owner of capital likes recessions though they do not mind boom conditions. But overall they are better served with a steady growth path of the economy with less uncertainty and fear afflicting them in the short run. The birth and continuation of stabilization policy has to be understood in this context. It must be admitted however, that the warranted stabilization policy prescribed under different circumstances and in different times and places have covered a wide-ranging proposals generating a lack of consensus on the theory of such policy. The debate that took off since the publication of General Theory in 1936, has never really cooled down though the mainstream literature today is dominated by the models which are the descendants of new classical macroeconomics. Lucas has observed (1987) that costs of business cycles were insignificant with a hands off approach taken by macro-policy makers and stability in the monetary aggregates. This has not only stimulated further theoretical and empirical studies to prove or disprove him, but also challenged new-Keynesian theorists to provide robust micro-foundations for a structure that can generate their essential propositions.

Finance studies the allocation of resources under uncertainty where some agents in the economy contract to acquire money from others subject to certain conditions of repayment. The analysis can be in a bilateral setting, partial equilibrium setting or a

general equilibrium setting. The subject becomes interesting due to the element of uncertainty regarding future repayment. This uncertainty affects the intertemporal allocation of resources apart from the intra-temporal allocation. Therefore it raises the issue whether finance has a connection with intertemporal (macroeconomic) fluctuations in output, investment and employment. The purpose of this paper is to explore this connection with the final aim of enriching our theory of business cycles. I think it is the most logical way to understand recent financial and real economic crises in developed as well as the emerging markets of the modern world economy.

The next section of the paper is concerned with an analysis of the state of the art business cycle theory with due recognition to the alternative approaches. Next we examine the subject of finance and analyze different financial mechanisms built in business cycles. The last section concludes.

Section 2. Data and Theories of Business Cycle

2.1 Data

Ultimately a theory has to be confronted with the real world data. Theoretical modeling may have a better chance of passing the empirical test if introspection and abstraction at the initial stages is accompanied by a sense of the statistical results concerning growth and volatility rates of the vector of aggregate variables, and a knowledge about the variance-covariance matrix of these variables. While ideally one should have data over the cross section of market economies world wide, data sets are neither complete nor available everywhere. USA is the leading source not only in terms of its long historical

association with the market experiment but also because it has a better data set than many of the European market economies. For this reason, here I limit myself to a discussion on the USA data with some observations on the experience of some of the other market economies.

Fluctuations have been more pronounced and usually more persistent in the 19th and early 20th century USA especially till the end of the Great Depression. Financial crises like endemic bank runs and stock market crashes were also associated with the early fluctuations. Higher growth rate associated with low amplitude and a tendency towards low frequency business cycles followed in the next thirty years[1]. The oil shocks and stagflation experience of the early 1970s caused a sharp and deep recession in the advanced Western market economies like USA and created a resource bottleneck awareness not only in empirical macroeconomics but also in it's theoretical counterpart. The 1980s was a prosperous decade during which growth rate again rose. However, during the same period some bank failures occurred which had spillovers in financial markets and household welfare and savings decisions. The 1987 stock market crash was sharp and deep and created large wealth effects but did not lead to a systemic crash and a prolonged recession. The 1990s was the age of IT revolution with tremendous progress, wealth accumulation and regime shift in data communications and processing technology. It was accompanied by a restructuring of the economy as individuals and

[1] One reason for the regime shifts in business cycles has been the associated shifts in policy. For example, monetary disturbance was a significant factor in the early times and was correlated with national income variability as well as persistence; but since the emergence of Federal Reserve and it's stabilizing monetary policy through such means as inflation targeting, such disturbances have caused a different pattern of correlations. The same argument goes for fiscal policy. However, there are other important factors behind the shifts like institutional changes and learning dynamics (both of the public and the policy maker).

firms became more oriented around the new technology and it's growth as well networked with each other. Venture capital experiments together with adoption of innovations and a big R&D policy in large service industry and technology firms further accelerated the process of capital stock accumulation as well redefining capital. Technology finance came of age in the natural process given the demand of the times.

In 1997 the Asian financial and real economic crisis shook some of the financial institutions like hedge funds in the US but the real sector kept progressing, in 2001 the dotcom bubble burst in the USA and was a major setback to the financial sector. Focus had shifted on containing dangerous bubbles in asset markets but the real estate bubble and the race for securitization was gradually taking place. When the bubble burst and defaults and foreclosure started, the subprime crisis hit in 2007. In 2008 the investment banking industry was found sitting with worthless securitized assets and a major financial crisis started whose end we have not seen till today.

Coming back to volatility and covariance we generally get the following picture: Investment is most volatile followed by hours and output while consumption is relatively smooth. Investment, employment and asset prices are pro-cyclical, wages are acyclical, and interest rates and productivity are countercyclical.

2.2 Real Business Cycle Theory : insights, reflections and discontents

Modern macroeconomics is based on two paradigms – the infinite horizon representative agent model and the overlapping generations model. The former is most suitable for

business cycle analysis and here we shall restrict our discussion to it. The infinite horizon Representative Agent (RA) model is a typical abstraction from differences across individuals in terms of tastes, technologies, information and endowments that is the starting point of trading models of general equilibrium. Instead, the RA model focuses on how the economy represented by a single agent adjusts to shocks and whether the observed pattern of co-movements between macroeconomic variables are generated by the model. Another issue is the degree of persistence of shocks, how much time does an economy take to recover from a negative shock? The specification of shocks can vary but typically shocks are assumed to hit the production process: they are technological or productivity related in nature. The optimal growth model under uncertainty was amended and developed by Kydland. and Prescott (1982) and Long. and Plosser (1983) to fit US business cycle facts by calibrating the model with values of parameters based on past US data and simulating the model on computer by writing and running a software programme like FORTRAN. The Lucasian (see Lucas (1972), (1987)) insight is that business cycles are optimal response of the economy to the shocks produced by a stochastic process, and that, therefore, cyclical movements perse do not warrant any intervention. Strange as it may seem to old fashioned macroeconomists or dyed in the wool Keynesians, the insight is important and deserves merit and attention. First of all, the focus on the welfare or normative side of the business cycles together with positive questions is an important step in macroeconomics. Second is the recognition of the recursive nature of the macroeconomic problem, that is at each point of time we are confronted with same conceptual situation of an infinite horizon where the state variables are the current vector of shocks and the economy wide capital stock and control variables

are savings and labour choice. This has created a methodological revolution by bringing in the toolkit of dynamic programming which is used to determine the policy functions and characterize the optimal path of the endogenous state variables (see Stokey and Lucas with Prescott (1989)). Thus a shock is optimally transmitted through the capital accumulation process and can slow it down.

However, there are several problems with the RA model. One is that intertemporal labour-leisure tradeoffs in reaction to shocks are much less in practice and cannot be said to really create fluctuation in output and labour hours. The natural reaction is to offer models of labour market which are not clearing with demand constraints playing a role. While this appeals to intuition, it is not easy to replace the equilibriating model with a rationing one where the latter is not adhoc to some extent. However, the most important point to observe in this context is that if the labour-leisure supply side tradeoff story fails to create plausible mechanisms of intertemporal fluctuations, then the only candidate left is the demand for labour and therefore a role for firms.

Another criticism is the notion that a representative agent model does not capture the trading problems that arise in an economy and create self fulfilling equilibria some of which may be associated with aggregate levels of low output, investment and hours worked. This could happen due to strategic complementarities present between different sectors, or in a model which allows for simultaneous rationing of the labour market and goods market producing a Barro-Grossman type of quantity effects. When does a macroeconomic model that explicitly takes into account the financial sector exhibit

multiple equilibria and what is the generic mechanism that causes multiplicity? This question has to be seriously addressed.

Another challenge is to question the rational expectations assumption, amend the model by incorporating bounded rational learning rules and examine the history dependent dynamics.

A last substantial critique of would argue that a model that does not explain the positive value of money as an asset has abstracted too much and misdirected the research programme. To keynesians money is not only a source of disturbance due to shocks hitting the preference for liquidity but it also has strong propagation properties as well. Further their vision encompasses a model (i) with many types of financial assets with different degrees of liquidity and risk-return characteristics where money is only of them (ii) financial institutions like banks and stock exchanges and central bank policy that emerge endogenously within the model. Keeping primarily the last criticism of the Real Business Cycle Literature in mind, we turn to the theory of finance to see what relevant additional microfoundations can be laid to enrich the RBC paradigm.

2.3 Alternative Frameworks

Coordination failure models of business cycles (see Cooper and John (1988)) have become popular of late. The coordination game is created with strategic complementarities and positive spillovers thus generating Keynesian multiplier effects and making equilibria pareto ranked. Dynamic coordination games have also been

proposed to understand phenomena such as delay and cycles (Chamley and Gale (1994)). Such frameworks lead to learning models, and deeper understanding of conjectural variation games. Mechanisms which select equilibrium are being explored and recently higher order expectations have been identified as a powerful device which does.

A more promising development shows the tendency for researchers to integrate informational microproblems into credit markets and try to reinterpret the essence of the business cycle problems (Stiglitz and Weiss (1981), and Greenwald and Stiglitz (1993)). Much has been learnt here.

Development of the concept of liquidity into a formal apparatus by Diamond and Dybvig (1983) and Byrant (1980) represented an important breakthrough in business cycle analysis, though the full impact is yet to be realized. Others have been finessing the concept and Allen and Gale (2001) deserve special mention for integrating the concept with the paradigm of general equilibrium theory.

Lastly, mention should be made of endogenous cycle theory and also chaos theory (see the survey by Boldrin and Woodford (1990), Farmer and Guo (1992) and Woodford (1986)). Using nonlinearities in economic relationships and the notion of self fulfilling prophecies, these theorists have tried to explain real and financial data over the business cycle. Generating cycles without shocks, the new successors of Goodwin have brought back and generalized the notion of the accelerator.

Section 3. The Theory of Financial Mechanisms

3.1 The Fundamental Problem of Financial Contracting

Just as one could ask why fiat money with positive value exists, one could ask the same thing of other financial instruments like debt, equity, and derivative securities like financial futures and options. The nature of the financial contract depends on the risk aversion of the parties, limited liability constraints, private information which requires screening or signaling etc. Thus one could see debt with rationing by banks, or issue of debt as a commitment device or coordination on financial innovation when strategic market interaction is taken into account (see Gale and Hellwig (1985), Hart (1995), Allen and Gale (1994)). The financial contracts whether on a cross sectional basis or on an intertemporal basis eventually determine the degree of risk bearing and sharing in the economy and thus become crucially linked to consumption and investment decisions.

To take a partial equilibrium view, think of an economic agent in need of funds. He can be a consumer who wants to borrow against his future income to increase present consumption or a firm which wants to make investment in new capital stock and / or finance the wage bill for continuing production. The agent seeks funding from a bank or the securities market. But the latter group may not know whether the agent can repay the loan or pay rich dividends. It is this uncertainty which may prevent the agent from getting the finance in the first place. If there were no uncertainty, then there would always be efficient allocation of funds to the economic agents who could pay a competitive return on the funds lent. In case of uncertainty, consumption or investment can be constrained in an inefficient way. Worthy borrowers may not be able to procure funds since there is no

way to tell who is worthy and who is not. Usually the borrower will have more information about his creditworthiness (the probability of success, the degree of management effort in the project or the actual state of return) than the outsider financiers. Such a situation is typically known as a situation of asymmetric information or private information. Consider the case of adverse selection credit markets. Since efficient firms may be credit rationed and the interest rate will not go up even if firms are credit rationed, efficiency warrants that there be ways in which information about the type of firms get revealed. Note here that information is an important economic factor here which can make a difference in the allocation of scarce resources over competing projects. Typically correct information may get revealed if firms and borrowers take some strategic actions. Banks can screen borrowers by offering different lending packages which different types will choose in a way that one can tell the type of the borrowing firm from the lending package chosen. Borrowers can play a signaling game in the sense that efficient borrowers may try to send signal their types through their choice of capital structure or some other costly action which the inefficient firms cannot find profitable to mimic. However, as Rosthchild and Stiglitz (1976) noted, the screening games may not necessarily yield efficient outcomes all the time and in fact equilibrium may also fail to exist. Signaling games may also generate pooling or non revealing equilibria. Collateral can make a difference as shown by Bester (1994). The problem with collateral is of course that poor agents without sufficient collateral may not be able to signal their credit worthiness or get screened out. This creates inefficiency and can also create persistent inequality in wealth and income distribution and lack of occupational mobility causing further welfare loss. In general the most efficient way turns out to be monitoring by

financial intermediaries like banks and mutual funds. Mutual fund participation may be constrained by limited participation due to costly delegation. Close monitoring is facilitated by relationship banking and can overcome the private information problem. However this might lead to soft budget constraints and hold up problems. Further, relationship banking is under threat from finance through markets. Therefore, finance constraints can play a non negligible role and calls for remedial measures by firms. One way is to build up reserve funds. Indeed internal finance is very important today compared to external finance. However, it is not easy to build up reserves because it requires that under profitable times, some good projects be foregone. But given such a program, it undoubtedly reduces the amplitude of cycles. Consider a situation without such a program and suppose there is a shock to asset values which reduces the value of firm collateral and net worth (see Bernanke and Gertler (1989), and Kiyotaki and Moore (1997)) such that borrowing constraints begin to bind. This will lead to a cutback in investments which can cause a further reduction in asset prices by reducing the demand for real assets produced by other sectors and / or generating panics in financial markets. With reserves in place, the credit constraint has a lower probability of binding and thus causing an adverse chain reaction. The tradeoff is of course that capital accumulation of the economy will proceed at a slower rate. The time preference and risk aversion of the economic agents will be crucial in determining the optimal tradeoff.

3.2 Money and Finance in General Equilibrium Theory under Uncertainty

Finance, from the GE perspective, is the analysis of the role of financial assets in bringing about an efficient allocation of scarce resources. Consider the Arrow-Debreu

Model of general equilibrium under uncertainty. As long as state contingent trades are possible, there is no role for financial assets. However, if such state contingent commodity contracts are not possible to make due to the complexity and transaction costs associated with such trade and only spot markets are present, the same efficient allocation can be reached by a set of financial assets whose return vector are such that they span all the states of nature. One example of this is the set of arrow securities (see Arrow, K. J. (1964)) where each such security exists for each state of nature and gives a return of one unit of the numeraire good.

When the set of linearly independent vector of asset returns do not span all the states of nature, markets are said to be incomplete. Under incomplete markets agents cannot get insurance against some set of states of nature and are therefore constrained in their consumption or investment decisions. There exists conditions under which welfare could be improved through wealth redistribution (see Geanakoplos and Polemarchakis (1986)). This has a direct implication for macroeconomics. Consider for example the Scheinkman and Weiss (1986) story with two agents who are heterogenous in the sense that productivity shocks are negatively correlated and at any point and only one is productive. This gives rise to the demand for durable goods that can be exchanged for consumption goods. The distribution of initial wealth affects the stochastic path of output in this economy and redistribution could theoretically atleast, lead to Pareto improvements.

Another consequence of incomplete markets may be that there exists a role for money in a general equilibrium model. Consider an example where there are two consumers, one

consumption good, two states of nature and two dates. The first consumer has one unit of good one at date 1 and none at the second date. The second consumer has one unit of the consumption good at date 2 and none in the first period. Suppose they value consumption in each period equally. If trade was possible the first consumer would exchange half unit of the consumption good at date 1 for the promise of an equal amount of consumption good at date 2 with the second consumer. However, there is the possibility that second consumer will not fulfill his promise at date 2 after the he gets his share of consumption at date 1. If such a situation of lack of trust is present, trade may will not take place at date 1. As shown ingenuously by Gale (1982), money may turn out to be a perfectly substitute for trust and restore the efficient allocation. Consider the government printing out one unit of indivisible money and demanding it back at the end of the second period. Now agent two can finance his first period consumption with money since agent 1 will have a positive demand for money in date 1. The positive demand results from the fact that agent 1 knows that agent 2 will need to have money in the second date in order to return the same to the government. Therefore it implies that agent 1 can finance his consumption at date 2 with money successfully. More generally, under incomplete markets there will be a positive demand for money at date 1 since that is the only way consumers can finance their consumption in the uninsurable states at date 2 (and onwards). This is a powerful insight which can significantly enrich the real business cycle paradigm. Whenever asset markets are incomplete, financial innovation has a chance to occur and may increase the risk taking in the macroeconomy.

To develop a serious monetary model one should be able not only to show the existence of money but also how the quantity of money matters. In particular, one should be able to find the optimal monetary policy rule in such a model : whether non stochastic monetary policy is better than a fixed money supply (growth) rule, the optimal real rate of interest, and also address the debate between active (discretionary) versus rule based monetary policy. Fortunately, Lucas (1972) has shown in a rational expectations framework how to address such questions. In his model, there are real shocks which are temporary and money shocks which are permanent. Individuals see only prices but not the shocks. If they knew the structure of shocks they would adjust to the real ones only but they don't. There exists a stationary rational expectations price function which may not be fully revealing the structure of underlying shocks and thus agents would react to money shocks producing positive correlation between money and output. The message of Lucas is that a non stochastic money supply rule allows agents to decipher the real shocks perfectly and therefore keep the economy on the optimal path. This is in fact, one of the reasons why money is absent in the real business cycle paradigm – it implicitly recognizes the optimality of a rule based monetary policy. However, Azariadis (1981) has shown that a stochastic monetary policy may dominate a completely non stochastic one. He uses a variation of the argument of second best theorems: when there already exists distortions (due to inability to decipher different types of real shocks for example), removing another distorting factor (stochastic element in the money supply rule) may cause welfare losses. The challenge here is to incorporate the intuition and get a richer quantitative idea about stochastic policy by incorporating money and modifying the RBC paradigm.

Another way to model money is by focusing on the liquidity property. Suppose there are three dates 0 1 and 2. Suppose at date zero a representative consumer faces the uncertainty of whether he needs to consume more at date 1 or date 2. Typically, under this situation he will keep part of his savings in a safe liquid asset which can yield a consumption at date 1. This can be thought of as money (note that it is precautionary demand for money which is important here). The other part of savings can be kept in an asset which yields higher return but is illiquid (like long term bonds without a good secondary market). Diamond and Dybvig shows that financial intermediaries offering deposit contracts can insure against liquidity uncertainty faced by the consumers using the law of large numbers effectively. That is if the bank knows the proportion of early consumers, then it can invest in the safe asset in an amount which exactly meets their withdrawal demand from the bank at date 1. While this a useful paradigm in its own right, it may not be easy to integrate this paradigm with the RBC type of macroeconomic story. There are two possible approaches. The first is to assume a stochastic discount factor as creating liquidity or intertemporal demand shocks in the representative agent economy. The second and the harder way to do this would require heterogenous consumers and breaking each time-period in two parts. Each consumer is maximizing the welfare from the stream of consumption in each period and also deciding his savings portfolio in light of the uncertainty whether to consume early or late during each period. The important question is whether liquidity uncertainty matters in terms of cycles. If there is an expectation of adverse liquidity shock then what are the implications for business cycles? Here is a plausible story: Agents can switch to portfolios which are more flexible like bank deposits. However, if the return on bank deposits are low then it can

cause a reduction in aggregate savings and therefore investment. As a result the output will be lower next period. What can policy do to improve the state of affairs? If the problem stems from increasing returns and monopoly elements in banking then regulating the rate of return on banking through competition and interest rate policy may turn out to be welfare enhancing. Higher deposit rates may lead to higher aggregate savings primarily in the form of bank deposits and can be translated into investment. However, the problem may not stem only from structural factors in banking, even with competitive banking the deposit rate would be low due to higher supply.

In the debate between banks versus markets a key concept is limited participation by investors. Investors are averse to risk and participate less in trading when there is greater risk. As a result the investors who are participating and need to liquidate will find a thin market and low price for the assets they want to sell. This will make investment in short term assets more attractive. As a result, under direct finance the investment in fixed capital is low. Under bank financing, the investors are guaranteed of a return and participate more. The liquidity problem is directly taken care of by banks. So the question is how banks design their asset portfolios. Banks will not have a tendency to hold excessive short assets beyond what is required to cover the depositor needs provided banks are not facing the liquidation problem also. It depends on what the investors in the market are doing. Will they buy securities like bonds and equity? If they do banks will hold long term assets more. An interesting question is whether monetary policy changes the relative attractiveness of equity or bonds issued by firms. A monetary policy which stabilizes interest rates under a rational expectations equilibrium can protect the buyers of

credit derivatives. Another possibility is that participating agents can acquire superior information about directly issued securities. If that is so then they need to have an incentive to acquire information and that condition turns out to be non revealing equilibrium. As we know already, a stochastic monetary policy can create non revealing equilibria. So a stochastic monetary policy can increase participation in markets, and raise the efficiency of direct as well as indirect finance and have counter cyclical properties in the sense that economic agents will have less incentive to hoard liquid assets faced with a liquidity shock.

As mentioned before, financial innovation can be profitable for financial institutions and firms in economies with incomplete asset markets. However, it is also true that financial innovation can increase risk taking. In the last two decades, a literature has developed in the field of finance claiming that securitization was an efficient mechanism that allowed better risks to buy more credit enhancements and increase welfare for the buyer as well as the seller (see in particular Greenbaum, S. and A.V. Thakor (1987)). The problem that we cannot reconcile such a view today stems from the fact that those models were partial equilibrium and not general equilibrium or macroeconomic models. In particular, while partial equilibrium analysis showed that financial transactions were of win-win nature, the general equilibrium or macro analysis can show that the same set of transactions could be win-lose in nature due to changing asset returns structure as a result of herding. This is the biggest challenge in integrating the fields of finance and business cycle analysis.

Section 4. Conclusion

In this conclusion I shall dwell on two things – first, a short review of the recent financial crisis in USA and second, an outline of a research agenda on integrating finance with business cycle theory.

When we observe past consumption data in the US, we see considerable amount of consumption smoothing. On the other hand, when we see data at the firm level, there is significant evidence of credit constraints, especially for the small and new borrowers. This implies that while the credit system does not encourage too much savings at the level of the households it encourages asset accumulation for the firms. There are two implications of this: one, that if there is a sudden systemic shock which leads to a credit crunch the households would not be able to keep up their consumption spending and two, there would exist a financial accelerator in the market for working and fixed capital credit. Internal Funds and Reserves would be important for firms in this scenario as firms would like to hedge against a credit crunch. With a strong assets market the asset prices would be high if there is high liquidity in the system. The demand for liquidity insurance from households will be low since they would prefer high valued assets. Participation would thus be high in asset markets. But excess liquidity would lead to speculation and bubbles in asset markets. Correlation of asset returns result in the euphoria and institutions holding these assets become vulnerable. Then comes a bursting of the bubble and the consequent shakeouts like firesales of assets and bankruptcies. The interbank lending freezes, liquidity trap develops and credit crunch becomes a reality. In the next round, consumption finance is restricted by financial institutions struggling to meet their

liabilities. Historians will argue for years why the investment banks did not cover their risk on securitization but it remains true that finance is a dangerous game with incomplete markets and systemic risk going hand in hand. The crises of 2007 (sub-prime) and 2008 (investment banking) are so large and sudden that any appeal to rational expectations based self-fulfilling prophecies is bound to mislead and it seems to this author that animal spirits will make a comeback in short run analysis of aggregate economic activity through a focus on partially revealing equilibria.

Coming to the second issue, to understand money and finance in a non-trivial fashion one has to begin with a sequence economy with some degree of market imperfections such as incompleteness. The first alteration one needs to the RBC model is to bring in strategic agents and study the dynamic pattern of trade between the agents. It has to be a heterogenous agents economy where time is discrete (may be continuous within period for more ambitious work), preferences are defined over goods and leisure over time with a discount factor which is driven by a stochastic process and a neoclassical-austrian technology (one can bring in externalities and re-switching elements if they are deemed important) with labour (whose efficiency is growing at an exponential rate) and capital and a stochastic process hitting the aggregate production function.

The Government (Fiscal and Monetary Arms, coordinating or not), the financial markets and the financial intermediaries have to specified such that they arise from the primitives of the time-taste-technology primitives. To begin with, we want to understand the financial constraints and the welfare policy of the Government. Therefore it is best to

treat the fiscal and monetary policy stemming from a common source with no coordination problems. An open ended structure is best with respect to financial markets if we want to deal seriously with the incomplete markets phenomenon. What about financial intermediaries? They should be modelled so that they can range from commercial banks to mutual funds to derivatives exchanges. This can create cross sectional complexities when we want to confront the financial structure data but in general a common specification can work quite well. Participation in markets and competition between intermediaries can be an important issue and it is clear that full participation and perfect competition can be misleading. The best strategy is to let the degree of competition be an exogenous parameter and allow participation to be an endogenous variable.

A basic objection with the representative model lies in the specification of the source of the shock to the economy. Technological shocks have produced growth and as a variable productivity shock is an important candidate in cycles since it has created technological booms with persistence. However, it did not produce the Great Depression, or the Latin American, Russian or the East Asian Crises nor can it be blamed for the recent US recession. In fact, monetary and financial disturbances have been argued by many as the shocks in all of these periods crises. Dissenting arguments find themselves more acceptable by characterizing these crises as self fulfilling prophecies rather than situations where economies dipped in response to some shocks to fundamentals. A reconciliation would be to examine the vulnerability of the financial sector where in financial markets agents play a game which is a coordination game and where equilibria

is not generically revealing. The coordination game would produce partially self fulfilling prophecies. Further, financial market interlinkage must be brought about by the model by considering the currency markets, stocks and derivatives, and financial intermediary contracts.

Due to forward looking character of the model, asset prices will be leading the cycle whether or not signals are extracted from the financial markets efficiently. When financial markets are efficient, fluctuations will be optimal but if not, bubbles and crashes may jeopardize the market economy and weaken it's resilience. Another aspect is overshooting or undershooting in financial markets. The conditions which create these have to be investigated within the structure or framework of the model. The most interesting question is what kind of correlations do financial and real variables have over the different phases of business cycle. Does monetary injections have better effectiveness in bust than booms? Why?

The main issue remains the efficacy of demand management policy. It would be unwise to treat it as a closed chapter and jump to models which blur the distinction between the demand and the supply side as some of the New Classical macroeconomists have done and been routinely doing. Decentralizability is trivial in a representative agent economy with convexity of preferences and technology. It is non trivial when the different sectors of the economy take decisions of their own. This simple point has been conveniently and regrettably forgotten. Lessons from undergraduate macroeconomics give us the first idea about how business cycle occurs in such a truly decentralized system. The feedback

between firm investment decisions and household expenditure decisions can amplify shocks and the automatic stabilizers built into the system makes sure that stability is guaranteed. However, such cycles can be costly when agents are risk averse. This is the first step in the micro foundation of macroeconomics which clearly indicates that countercyclical policy should be pursued if it is effective. It is a big if however, and one now has to remember all the sublime messages of policy neutrality passed on by generations of anti-interventionist economists. The first thing to remember is the Lucas Critique: when a policy is pursued, the systematic component is internalized by rational agents which can reduce the efficacy of policy. However, policy may still play a role. Suppose that in the rational expectations equilibrium framework policy interacts with agents decisions and we have multiple equilibria. The selection of the equilibira, if random, can exhibit policy effectiveness over a subset of such equilibria. Secondly, policy itself can help select the equilibrium. It is plausible however, that due to restrictions on the policy maker through its budget constraints, the effectiveness of policy may be circumscribed and bounded. The real task then is to understand the nature of the boundedness in an appropriately designed model. A related goal is to understand the relations and the relative efficacy of different policy instruments either fiscal or monetary and treat policy in a comprehensive rather than piecemeal manner. Modeling should tell us how to characterize optimal policy not only in terms of different components but also in terms of the deterministic versus stochastic weights assigned to such policy.

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