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A SURVEY OF RECENT DEVELOPMENTS IN MONETARY THEORY

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I. INTRODUCTION

This survey is dedicated to the development of monetary theory after 1973. It is in order to provide the necessary background to the new developments, that this survey starts in Chapter II, which covers monetary theory in the period after 1973. Recent textbooks (e.g., Forbes and Shaw 1974, Hansen 1980, and Mankiw and Johnson 1977; and Mankiw and Johnson 1980, 1979, 1974, 1973, 1976, 1975, 1974, and Johnson 1972) have been extremely useful. However, a key contribution, Taylor's Law of the Dólar between monetary models and Keynesianism, has not been developed here.
Dutch economy integrating the earlier FREIA and KOMPAS models; *Over de beheersbaarheid van de geldhoeveelheid* by S.C.W. Bijffinger (1986), which is innovative in that a monthly monetary model is constructed; and Den Butter (1986), a study of the implications of alternative model specifications, applied to the Netherlands.
II. AN EXTREMELY SUCCINCT HISTORY OF THE SUBJECT

1. The transmission mechanism of monetary impulses

Arguably the roots of present-day monetary theory go back to the quantity theory of money. The quantity theory in its turn can be seen as a reaction to, on the one side, the mercantilist inclination to identify wealth with money and, on the other side, the experiments of John Law, in whose opinion a large quantity of money was a great help in attaining wealth (this section draws heavily on Visser 1974 ch. 5 and 1980 ch. 5). It was predominantly within the framework of the quantity theory that economists began systematically to pay attention to the transmission mechanisms of monetary impulses, still a central theme in monetary theory. The quantity theory says that a change in the money supply ceteris paribus results in a proportional change in the price level. The interesting question of course is how this result comes about. In the theoretical sphere, it is not so much the comparative statics that is of interest (whether the ceteris paribus condition holds in a given situation is a matter of empirical verification, or should one say beliefs), but the dynamics of the impact of monetary impulses on prices and quantities.

The most influential early publication expounding the way in which changes in the money supply influence the real sphere of the economy was David Hume's 1752 essay Of Money (Hume 1955). Hume describes a direct mechanism: an increased volume of money induces economic agents to increase their spending on goods. The impact is first felt in a higher level of economic activity. Little by little the price level rises and economic activity falls back to its original level, until in the end it's only prices that are higher as a result of the monetary impulse.

There's also another mechanism: banks can keep the rate of interest below the level at which savings equal investment. This leads to higher borrowing and more spending. In this case an indirect mechanism, working via the rate of interest, drives up expenditure. The most elaborate exposition of this mechanism is Knut Wicksell's Geldzins und Güterpreise (Wicksell 1898), but it had been expounded nearly a century before by the great Henry Thornton (1978 pp. 253-5) and soon after by David Ricardo (1965 ch. 27) and Thomas Joplin (cf. Humphrey 1986). Strictly speaking, this is not a transmission mechanism of a monetary impulse, however. It's the rate of interest that starts things moving, not the money supply, though the volume of money increases in the process as the banks step up their lending. But a monetary impulse proper may also be transmitted via the indirect mechanism. Increased cash balances will not only be spent on goods but on financial assets.
as well. The prices of financial assets are driven up and the rate of interest falls, which acts as a spur to spending.

It might be thought that, if a positive monetary impulse is linked with a low rate of interest, a high rate of interest is an indication of a negative monetary impulse. This is not necessarily so, however. If a continuing positive monetary impulse leads to inflation, the nominal rate of interest will display a tendency to rise in step with the rate of inflation. If it lags behind, that in itself can be seen as a spending impulse via the indirect mechanism. It was again Henry Thornton who developed this idea, in a speech before the House of Commons in 1811 (Thornton 1978 pp. 335-'6), though Irving Fisher is generally thought of as its originator (Fisher 1930). Fisher also took pains to explore the ways in which inflation increases the velocity of money, which gives a further momentum to the inflationary process (Fisher 1963 ch. 4). It may be noted in passing that, unlike what many textbook writers assert, Fisher was far from assuming an institutionally determined quasi-fixed velocity of money in the short term.

2. Keynes, the neoclassical synthesis, and Leijonhufvud

With Keynes it is only the indirect mechanism that works. He took issue with the neoclassical idea of a self-regulating economic system in which the price mechanism sees to it that the effects of a disturbance are rapidly neutralized. In his view, the price mechanism does not work that fast, which is as well, because that would in itself create difficulties.

In principle the direct and indirect mechanisms cannot only be set in motion by an increase in the nominal money supply, but also by a decrease in the overall price level. In both cases real cash balances increase, and that is what counts. If aggregate demand diminishes - in textbook terms: the IS-curve shifts to the left - and wages and prices fall as a result, full employment could only be restored if the increased real balances would drive the rate of interest down to the full-employment equilibrium rate, i.e. Wicksells natural rate or Keynes's neutral rate of interest (cf. Keynes 1961 p. 253). The LM-curve shifts to the right, resulting in a downward movement of the rate of interest, known as the Keynes effect. This process itself is fraught with difficulties, because of the liquidity trap, on which Keynes's General Theory is a bit confusing. On the one hand, Keynes plays down the significance of what he calls virtually absolute liquidity preference (Keynes 1961 p. 207). On the other hand, he writes that the rate of interest "may fluctuate for decades about a level which is chronic-
to use dark forces of time and ignorance which enhance our nurture.

The consumption function in multiplicative or, more precisely, Keynes's simultaneous consumption function, does not go well in the Keynesian framework model. The reason is because the neoclassical approach, and his work, does not really satisfy us. Because the neoclassical approach a

This state of affairs, despite the neoclassical synthesis,

also won the intellectual battle; hence the phrase of economic policy rather than pure economic theory. In the stabilization and then reduced from the Keynesian attack and Keynes's score, the price level is given on the graph, the price level is given on the graph.
The neoclassical synthesis has since been undermined by Leijonhufvud who, building on Clower's 'dual decision hypothesis', has argued that one cannot make sense of Keynes within a model where Walrasian tatonnement pricing is assumed. The dual decision hypothesis says that economic agents may draw up 'notional' buying and selling plans on the assumption that all sales and purchases will be decided upon in one all-embracing, simultaneous decision process, such that nobody need take account of the possibility that sales or purchase plans cannot be effectuated, i.e., a tatonnement process. In actual practice, demand may be constrained by the possibility that sales plans cannot be effectuated (Clower 1961). The typically Keynesian notions mentioned above only make sense if we drop the assumption of simultaneous, all-embracing tatonnement pricing. In Clower's footsteps Leijonhufvud has pointed to the assumption of the omniscient Walrasian auctioneer, who conducts the tatonnement process, as the essential difference between Keynes and the neoclassics (Leijonhufvud 1968, 1969). In the neoclassical approach, economic agents have full information on the supply and demand functions of other economic agents, through the activities of the auctioneer. With Keynes they are groping in the dark (it is a bit ironical that tatonnement, a term used to indicate full information, itself means groping).

Developing the idea of imperfect information, Okun has made a distinction between 'auction markets' and 'customer markets' (Okun 1981 ch. 4). Imperfect information makes price stickiness attractive to both buyers and sellers in customer markets, where costs associated with shopping are relatively high and price stickiness helps to reduce these costs, essentially information costs. Similar ideas, revolving around the idea of implicit contracts, have been developed for the labour market (cf. Okun 1981 chs 2, 3). This approach has not yet led to a coherent and satisfactory theory of wage behaviour (cf. Van Hulst 1984 pp. 44-7). Wage theory, according to Thurow (1983 ch. 7, especially p. 202) should take account of interdependent preferences, i.e., workers lose their motivation and work less hard if they feel that they are badly paid relative to other workers, which, incidentally, brings us back to ch. 2 of the General Theory. The upshot of the ongoing debate is that a certain degree of wage stickiness is advantageous for both employers and employees.

3. Monetarism

In the mid-1950s, when the Keynesian income-expenditure approach in its IS/LM-form had become the paradigm of mainstream economics, Milton
Friedman and his associates launched an attack on it, aiming at a revival of the quantity theory of money (Friedman 1956). Gradually it became clear that the difference between the so-called monetarists and Keynesians, or broadly income-expenditure (IS/LM) theorists, did not really concern the analytical framework but was rather about different views, or beliefs, on empirical matters (cf. Friedman 1970, 1971, Journal of Political Economy 1972, Mayer 1975). A central tenet is that the private sector is inherently stable, in the sense that large fluctuations in economic activity are seen as due to government policy, whilst the private sector absorbs shocks rather than causes them (Brunner 1970 pp. 5,6). Underlying this idea is the belief that markets, if left alone, will function quite satisfactorily. Given stability of the private sector, i.e. a reasonably quick return to full employment after a shock, and a stable money demand function, it follows that a change in money supply growth can, after a transition period, only affect the rate of inflation.

The idea of an inherently stable private sector may be unpalatable for many economists. Other elements stressed by monetarists are less controversial. Prominent among these is the monetarists' view of the transmission mechanism of monetary impulses. Monetarists argue that a change in the money supply affects the economy via a great variety of ways, in addition to the interest rate effect on investment emphasised in standard Keynesian macroeconomics. An increase in the money supply disturbs the composition of asset holders' portfolios and gives rise to all kinds of substitution effects. These occupy the center stage in monetarist analysis, wealth effects (amongst which the Pigou effect) being relegated to a minor, though not negligible, role (Friedman 1969 pp. 229-'31, Brunner 1971, Sprinkel 1971 pp. 32-'4). Similar sketches of the transmission mechanism can be found with professed non-monetarists, notably Tobin, though for Tobin one link in the chain of effects is of paramount importance, sc. the ratio of the (stock-) market valuation of existing capital goods to the supply price of newly produced capital goods or q-ratio (Tobin 1971 chs 13,18). This ratio, which functions as a measure of the attractiveness of buying new capital goods, i.e., the attractiveness of investment, is widely used in empirical studies of investment behaviour (Malkiel, Von Furstenberg and Watson 1979, Ciccolo and Fromm 1980, Heerkens 1983).

The monetarists' view on the transmission mechanism may not be very controversial, their views on economic policy certainly are. With almost religious zeal they have preached the gospel of following rules for monetary policy, as opposed to fine tuning (cf. Friedman and Heller 1968, Friedman 1986). This is because the lags in the transmission process of monetary impulses can be long and variable, in their view. Given the assumed stability of the private sector, discretionary macro-
economic policy measures run the danger of working out pro-cyclically. The best the government (including the monetary authorities) can do is to keep the growth rate of the money supply within a small and pre-announced band, in that way minimising the probability of any disturbance arising, or its severity.

Apart from the fact that such advice hinges on the stability of the money demand function (see on this ch. VII section 1), it can only be valid in large, relatively closed economies on a floating rate system. It has, furthermore, been brought up against the Monetarists that the money supply is not exogenous and that money is an elusive concept, what with financial innovations going apace (e.g., Kaldor 1982). Essentially this is a repeat of the discussion following the publication of the Radcliffe Report back in 1959. The upshot of that discussion was that the money supply can to a large extent be exogenous, depending on the policy of the monetary authorities and, in a fixed-exchange-rate system, the interest elasticity of capital flows. Another conclusion was that financial innovations can, and do, frustrate monetary policy to a certain extent, but not completely (see for a discussion and references Visser 1974 pp. 46-50, 211-4).

Less controversial has been the Monetarists' emphasis on the longer term. Following Irving Fisher they argued that, in an inflationary process, interest rates will adjust to inflation. High nominal interest rates in such a situation are a result of high money growth, i.e. a lax monetary policy, rather than, as in textbook IS/LM-analysis, a result of tight monetary policy.

This emphasis on the longer run, and its concomitant more systematic attention to expectations, also put paid to the Phillips-curve trade-off between inflation and unemployment. The short-term Phillips-curve hinges on given inflation expectations. In the long run, expectations will adjust to inflation and the Phillips curve is perpendicular at the so-called 'natural rate of unemployment' (NRU), dubbed non-inflationary rate of unemployment (NIRU) or non-accelerating-inflation rate of unemployment (NAIRU) by economists who take exception to the ideological undertones of the adjective 'natural'.

Even if the idea of an essentially vertical long-term Phillips curve is by and large acceptable to non-Monetarists, there is a fundamental difference in that Monetarists believe that the economy is a self-equilibrating mechanism, whilst others do not necessarily believe such a thing. The economy will, in the view of Monetarists, after a shock which drives it off the long-term Phillips curve, automatically return to it within a relatively short period of time. Others may believe that the economy may stay to the right of the long-term Phillips curve after a deflationary shock for a considerable period if no stabilisation measures are taken by the government. Economists of all persuasions
will by now be agreed that any attempts to reduce unemployment **below** NRU or NIRU through monetary and/or fiscal policies, **cannot** but result in **(higher)** inflation. This **is not** to say that NRU or NIRU itself cannot be reduced. Any positive NRU or NIRU is a reflection of imperfect information and adjustment costs and/or a minimum wage level above the value of the marginal product of some kinds of labour. It follows that the government can reduce NRU or NIRU to the extent that it can improve information and help to reduce adjustment costs, including the costs of retraining.
III. CROWDING OUT

The Monetarists rejected 'fine tuning', i.e. discretionary or activist macro-economic policies designed to stabilise the economy. In their eyes, not only monetary policy is of little help to this end, fiscal policy won't do the job either. Expansionary fiscal policies will, given the money supply, to a large extent crowd out private expenditure.

It stands to reason that in a near-full-employment economy any expansion of real government expenditure can only occur at the expense of real private expenditure, i.e., there is real crowding out. In the IS/LM-diagram, a positive fiscal impulse shifts the IS-curve to the right, beyond the full-employment point. The ensuing rise in the price level makes the LM-curve and, through substitution and wealth effects, the IS-curve as well, shift to the left.

There will be nominal crowding out as well, so the argument runs: a positive fiscal impulse will increase nominal GNP by a lower amount, if at all. Various mechanisms can account for this phenomenon. First of all, with a vertical LM-curve a fiscal impulse will shift the IS-curve, with a change in the rate of interest as the only result. With an upward-sloping LM-curve, partial crowding out may occur. Apart from these rather trivial cases, there are other channels, which are more interesting from a theoretical point of view. One such channel is that an increasing volume of government debt in the hands of the public may be taken as an increase in wealth, resulting both in higher money demand (a shift of the LM-curve to the left) and higher expenditure (a shift of the IS-curve to the right). The outcome is uncertain. Furthermore, an increasing volume of government debt in the public's portfolios shifts the LM-curve upward (Hahn 1980 p. 11, Visser 1980 p. 290). This is often neglected in the literature, possibly because in IS/LM-analysis the credit market is usually not explicitly taken account of. The LM-curve, however, represents the equilibrium conditions in the market given the volume of debt. With a change in the volume of debt, the rate of interest that ensures portfolio balance at any given level of income, has to change. This effect may be called portfolio crowding-out. It has been argued that for crowding out to occur in this way, bonds and real capital must be closer substitutes than bonds and money. If bonds and money are close substitutes, an increase in the bond volume will, for reasons of portfolio composition, drive up the price of existing capital (Buiter 1985 p. 47, Tobin 1971 p. 225). This means that Tobin's q-ratio increases, i.e., the required rate of return on capital falls (see above, ch. II, section 3). There may then be a small upward movement of the LM-curve, but this is outweighed by an increased attractiveness of investment, which translates into a shift...
to the right of the IS-curve.

Yet another channel is ex-ante crowding out, i.e., crowding out without a preceding rise in the rate of interest as in the previous cases, because of ultra-rationality. David and Scadding (1974), who introduced the idea, studied the savings ratio in the United States over a 70-year period. They were struck by the fact that savings, including expenditure on consumer durables, were by and large constant over that period as a percentage of GNP, defined as including the imputed annual gross rental flow on consumer durables. This constancy occurred despite changes in the share of output absorbed by the public sector. They sought to explain this phenomenon by the assumption of ultra-rationality. This means that private economic agents consider both taxes and private consumption and private and public investment as (near-)perfect substitutes. When the government, e.g., provides a service, such as schooling or medical care, financed by taxes, that takes the place of privately bought services. Private agents lower their spending and the overall savings ratio does not change.

Finally, there is the Ricardian equivalence theorem (discussed by Buchanan 1976, Tobin 1980 ch. III), which might better be called the pre-Ricardian equivalence theorem (cf. O'Driscoll 1977, Feldstein 1982). This is another case of ex-ante crowding out, which results from full tax discounting: government debt is not seen as net wealth of the private sector, because private agents take account of the future burden of taxes that will be levied to pay interest and amortisation (cf. Barro 1974). Private agents will increase their savings in order to provide for these future taxes and the increase in government spending is offset by a decrease in private spending.

Empirical tests are not very encouraging for the idea of ex-ante crowding out (Feldstein 1982), though there is a certain plausibility in the notion that tax-financed education or medical care will reduce private expenditure on these items by more or less the same amount.

IS/LM models can be augmented with an equation for the government budget deficit. Such augmented models can be used to study the behaviour of the system when the government budget is not in equilibrium and either the money supply or the volume or government bonds is changing (cf. Blinder and Solow 1974). Wealth effects and interest rate effects move the system to a new equilibrium, if such an equilibrium exists, which may not be the case (Infante and Stein 1976, Buitner 1985). This kind of analysis can be extended to economies that are growing or have targets for the current account of the balance of payments or both (Van Ewijk 1986).
IV. NEW CLASSICAL MACROECONOMICS

The message of the Monetarists was that activist countercyclical macroeconomic policies do, if anything, more harm than good. New Classical Macroeconomics (NCME), or Monetarism Mark II as Tobin (1980 p. xiii) dubbed it, goes one step further and denies any systematic short-term impact of macroeconomic stabilisation policies.

NCME combines rational expectations in the sense of Muth with continuously clearing markets. Muth's hypothesis was that "expectations of firms (or, more generally, the subjective probability distribution of outcomes) tend to be distributed, for the same information set, about the prediction of the theory (or the 'objective' probability distribution of outcomes)" (Muth 1961 p. 316). Expectations, in other words, "are essentially the same as the predictions of the relevant economic theory". Expectations may prove far off the mark. Errors are, however, not serially correlated, as is the case with adaptive expectations which so often were assumed in empirical studies on inflation and interest rates and which underlaid the Monetarists' view of the Phillips curve.

The policy ineffectiveness proposition is usually derived from a model containing a supply function that allows for deviations of actual production from its 'natural' or NRU-level if actual prices diverge from expected prices (Sargent and Wallace 1975, Minford and Peel 1981). Price level shocks are first taken for relative price changes, which leads suppliers to change the volume they offer. Economic agents are price takers. Essentially price formation is of the Walrasian variety, though information is not complete and immediate. A Walrasian equilibrium system of equations grinds out a unique equilibrium level of employment, which corresponds to a unique equilibrium level of output. It is not possible to reduce unemployment below NRU other than by engineering a surprise price shock, which would be suboptimal from a social welfare point of view anyway. Government policy measures which follow a rule are impotent, because the public will soon enough know the rule. Still, it has been shown that slight modifications to the basic model suffice to undermine the policy-ineffectiveness proposition. In some models stabilisation policies can reduce the variance of output (Minford and Peel 1981, Asako 1982, Dickinson, Driscoll and Ford 1982) and, if we assume non-linearities in the supply function, even influence the average level of output (Shiller 1978).

All kinds of objections can be brought up against NCME. The most fundamental one arguably is that NCME assumes away all the real-life problems that could provide a case for stabilisation policies. In an all-embracing Walrasian market system with full price flexibility and economic agents acting as price takers, underutilization of resources
just as the case of political activity. A study of the business cycle in the recent past suggests that
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the price level of the economic cycle in the recent past.

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actual prices out of line with expected prices in an NCME approach, whilst it distorts relative prices, above all interest rates, with the Austrians.

It is often argued that Monetarists and NCME adherents on one side and Austrians on the other should not be lumped together. Austrians are, correctly, said to emphasise microeconomic processes and to have little time for aggregative analysis (Haberler 1963 pp. 33-67, Hayek 1967, Reekie 1984 pp. 66 ff.). Monetarists and NCME adherents purportedly neglect relative price changes following upon a monetary impulse. As far as the Monetarists are concerned, this argument seems mistaken (cf. Humphrey 1984). The idea is perhaps due to Friedman's example of a helicopter dropping dollar notes which are distributed over the members of the community in the same proportion as the existing cash balances (Friedman 1969 pp. 4-7). But Monetarists such as Brunner and Meltzer have always gone to great pains to explain the transmission process of monetary impulses, and Friedman himself painted a similar picture (see Ch. II section 3 above). The differences between Austrians and NCME adherents seem to be larger than those between Austrians and Monetarists (cf. on this subject Scheide 1986). NCME sees economic actors as having much, though not full, information. They live in a world of risk, not uncertainty (i.e., they can make an estimated guess of the probability distribution of the outcomes of a decision). Austrians, on the other hand, are in one respect much nearer to Keynes: they take the "dark forces of time and ignorance" seriously.
Money and Banking textbooks have no difficulty explaining the use of money. Money facilitates the exchange of goods and the division of labour by lowering transaction costs. There is nothing wrong with that story, but when it comes to incorporating money in microeconomic general-equilibrium models, it proves extremely difficult to explain why people would be willing to hold a non-interest-bearing asset for transaction purposes and why the use of such an asset could lower transaction costs. In the textbook story money does away with the need for a double coincidence of wants for a transaction to take place. More generally, the use of money reduces the transaction costs (in the guise of information costs) which a seller incurs to find a buyer and a buyer incurs to find a seller. Not surprisingly, in Arrow-Debreu models, where transaction decisions are taken at one moment for all future dates, money finds no place (cf. Debreu 1959). Arrow-Debreu and, for that matter, Walrasian equilibrium models with money are not very satisfactory because they provide no reason why goods shouldn't exchange directly for other goods (cf. Hahn 1973 p. 23). The Walrasian auctioneer who, or the tâtonnement mechanism that, regulates the buying and selling process are devices expressly introduced to abstract from information costs, the very rationale of the use of money. Patinkin's attempt to integrate monetary and value theory in his painstakingly written *Money, Interest, and Prices* (Patinkin 1965), which can be seen as the culmination of the Walrasian tradition, is a glaring example of the ultimate futility of introducing money in a general-equilibrium model where all goods exchange against all goods. Patinkin tries to "conceive of a barter economy as the limiting position of a money economy whose nominal quantity of money is made smaller and smaller" (Patinkin 1965 p. 75). This attempt was doomed to failure, because prices fall in step with the nominal money supply and the real quantity of money is not reduced. Patinkin realised full well that one cannot compare a barter economy with a monetary economy in this way. His argument, however, was that "in a barter economy there is obviously neither an excess-demand equation for money nor a dependence of commodity excess-demand equations on real balances (ibidem). No mention here of different exchange technologies in the two systems.

A step forward was made by writers who constructed general-equilibrium models with transaction costs, prominent amongst them Niehans (1969, 1971, 1975, 1978). These models leave the question unanswered why transactions which involve the use of money should be cheaper than transactions that do not. Brunner and Meltzer (1971) delve deeper into the nature of the transaction costs that are saved upon by the use of money. In their view, these transaction costs are, apart from costs of
transferring and storing (which can best be seen as production costs), in fact costs of acquiring information on assets.

In actual practice the choice which confronts economic agents is not between autarchy and transactions in accordance with double coincidence of wants. There is also the possibility of a sequence of transactions. The costs of these transactions can be kept low by using some assets rather than others. Repeated use of some assets and some transaction sequences will lower the marginal cost of acquiring information.

Stimulating though Brunner and Meltzer's analysis may be, it still leaves one somewhat in the dark about the nature of the information sought. A clue is given in a footnote, which says that "If there are no costs of acquiring information, differences in the timing of receipts and payments are adjusted by issuing verbal promises in exchange for goods and, later, delivering goods" (Brunner and Meltzer 1971 p. 785 nt. 4). Though this idea was not taken up at the time, recent developments follow a similar track. E.g., Gale argues that in a world without a complete Arrow-Debreu system of markets, trading continues after the first date. The value of sales will not at every moment in time equal the value of purchases for all actors. Money holdings then serve to absorb the difference, at which point Gale, like Brunner and Meltzer before him, observes that "If agents were really trustworthy there would be no need for a sequence of budget constraints" (Gale 1982 p. 186, see also pp. 197, 235, 245). Agents could, in other words, issue debt (IOU's).

The point of trustworthiness is also stressed by Illing (1985). Even if agents were immortal, there would be no complete Arrow-Debreu system of contingent future markets, if only because of moral hazard problems which follow from asymmetric information. The argument runs as follows. Households are at the start of every period supplied with endowments of perishable consumption goods. These endowments are risk variables, with a known probability distribution. Households could even out the fluctuations in individual endowments by concluding insurance contracts. But there is asymmetric information. At any moment in time, households know their own endowment. Others do not, i.e., the insurance company has to incur costs to collect information on individual endowments. There is, therefore, an incentive for households to cheat. It may in these circumstances be advantageous to hold money as a substitute for costly insurance. But why, again, money rather than IOU’s? Illing here follows Gale: because financial assets other than money imply information costs (Illing 1985 pp. 81-82). One might object that such a model is far removed from reality, but such an objection would be beside the point. The aim is to find the essential or minimum requirements for a monetary economy, not to give a realistic description of a monetary economy. One will not be surprised to find that a time duration and
information costs are minimum requirements of a monetary economy, but it may be thought rather striking that uncertainty as to prices or interest rates, which looms large in Keynesian money demand functions, is not a necessary precondition.

The last word has certainly not been said on this subject. There is no lack of fine ideas, but to model these ideas is no mean task. One thing at least is clear: timeless general-equilibrium models won't do. We need models that provide for sequences of trades. People like Gale and Illing are most probably on the right track. Information costs may well be the key to the use of money, as they also explain its typical characteristics of divisibility and liquidity, plus its power to lower transaction costs (cf. Gale 1982 pp. 187-'8, 194-'7). Having found the minimum requirements of a monetary economy, the next step should be to incorporate production in the model and to take account of the better specialization made possible by the use of money, which means that the endowments in monetary economies differ from those in barter economies (cf. Hahn 1973 p. 234). But this poses enormous technical problems.
VI. COMPETING CURRENCIES

Apart from business-cycle theory, there is another subject where the resurgence of Austrianism is felt, sc. the idea of competing currencies. At first sight covering this idea of Hayek's adds a touch of the quixotic to this survey, but underlying Hayek's proposal are very serious considerations of social philosophy. Moreover, the discussion on competing currencies bears on the very topical issue of the viability of the private use of the European Currency Unit or ECU.

Hayek proposes to give private enterprises the right to issue their own money, not in the sense of commercial banks creating sterling or DMark or Kronor, but separate currencies in their own right (Hayek 1978, 1979). Money is too important to leave its supply or the supervision on its supply to the government. Democratic government cannot be trusted not to tinker with the money supply in order to pursue short-term ends. Democratically elected governments will do their utmost to get re-elected after having served their term. They are under a constant temptation to abuse their power over the money supply in order to fulfil the demands of the groups in society whose support they think they need for their re-election. For a long time Hayek believed that a system of fixed exchange rates could provide the necessary discipline, but when his hopes were disappointed he swung to the other extreme. Not only will governments defraud people by satisfying the demands of interest groups via the printing press, the lack of monetary discipline may also be seen as the cause of the instability of market economies.

The only way Hayek sees to prevent debasing of the currency is to introduce competition in its supply, just as with any other commodity. Governments need not give up their right to create money, they only need to give their monopoly. In a competitive system it will be in the interest of the issuers of money to create a currency with a more or less stable purchasing power, otherwise money users would switch over to the currencies provided by competitors. Competition provides a discipline which governments sorely lack. For Austrians, it is not only a technical matter. There's also a moral side to it: only governments can renege on debts by simply printing money (Barry 1981 p. 26). Thanks to their control over the money supply, governments can put themselves above the rules by which everybody else is bound, thus undermining the standards of conduct that hold societies together.

Leaving aside other technicalities, one may ask whether 'good' or stable currencies will not be driven from the market by 'bad' or depreciating currencies through the working of Gresham's Law. Hayek has pointed out, however, that Gresham's Law is only valid in situations with fixed exchange rates between the various currencies (Hayek 1978 p. 38; Starbatty 1982). With variable exchange rates 'bad' money depre-
Further research is to be expected.

The exchange rates cannot be predicted in order to reflect changes in the underlying arbitrage opportunities. It is apparent that exchange rates should be allowed to

commercial banks, with the active support of the European Community.

The new, 1976, proposal may belook impractical, but it does bear on

Is it competitive that some currencies are in use in more than
two countries? Is it competitive that a number of countries
are promoting the use of the Euro. It is agreed by some that a
number of different official currencies

although this makes it less attractive to hold.
VII. MONEY DEMAND

1. Stability and instability

One cornerstone of monetarist thinking has been the stability of the money demand function. If money demand were not a stable function of a restricted number of variables, stabilisation of the growth rate of the money supply would be of little help in stabilising the real side of the economy. An enormous amount of research effort has gone into estimating money demand functions, without any conclusive answers coming up as yet. Often, some specifications of the money demand function perform reasonably well for some countries and some periods, while others do for other countries or other periods (cf Andersen 1985, Den Butter and Fase 1981). Often, considerable instability is found, with financial innovations usually seen as the main culprit (cf Akhtar 1983, with a survey of empirical research, Judd and Scadding 1982, also with such a survey). Other causes of instability, or shifts, in the money demand function mentioned in the literature are institutional changes (caused by monetary policy measures) and changes in exchange rate regime (Boughton 1981). Only the Reserve Bank of St. Louis seems to cling to the idea of stability through thick and thin (Hafer and Hein 1979, Hafer 1984, Hafer 1985). Two other possible explanations have interesting theoretical implications, which is why we pay special attention to them. The first one is the idea that the Walrasian money market may be out of equilibrium at any one moment, or, alternatively, there may be a temporary equilibrium not in consonance with the actual values of the arguments in the money demand function, thanks to buffer stocks. The other one is that the demand for foreign currency may impinge on the demand for domestic currency, a phenomenon known in the literature as currency substitution.

2. Buffer stocks

Given a situation of equilibrium in the Walrasian money market, a monetary impulse leads to excess demand or excess supply. Excess demand or excess supply means that adjustment processes will start that normally (on the theoretical plane) take place via the price mechanism. Economic actors will adjust their portfolios to the changed volume of money, which means that they will try to buy or sell other assets, in the process driving the prices of those assets up or down. There may be frictions in this process. Time and money are involved in adjusting one’s portfolio and in gathering and processing the information needed
the money demand function (of) Keynes, 1937 —. The demand function, t.e., an incorporation of Keynes’s income motives in

the expenditure function, with planned expenditure one of the elements in the money expenditure function (of) Keynes, 1937 —. An increase in expenditure, either because of an increase in the price level or because of the machinery of contract, will lead to a movement of goods out of period t to period t + 1, so that the quantity of goods traded during the current period will be greater than the quantity of goods which were traded during the previous period. This effect is also used by Keynes to resolve the conflict between the liquidity preference theory and his own theory of interest.

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unrelated to the price of the real-balance effect. When money is set aside, the demand for money will increase again.

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The relevance of the idea of buffer stocks, or quasi-equilibrium, or temporary equilibrium, for the money demand function is that instability in money demand, found in econometric research, need not really reflect unstable money demand (cf. Mahajan 1980). It may, instead, result from a monetary disturbance which is not immediately resolved through the transmission process of monetary impulses. What looks like unstable demand may in fact be a case of delayed adjustment or, in Hines's approach, of anticipation of a change in expenditure. In the case of delayed adjustment there must, in view of the supposed reasonably quick adjustment speeds in the financial sector, be a succession of supply shocks. Indeed, that is a solution suggested by Artis and Lewis to explain the apparent breakdown of the stability of money demand in the United Kingdom during the early nineteen seventies (Artis and Lewis 1974).

3. Currency substitution

The other explanation of the apparent instability of the money demand function mentioned above is currency substitution. This idea, preached with unremitting zeal by R.I. McKinnon, implies instability in the demand for domestic currency, as foreign currency may act as a substitute for domestic currency in economic agents' portfolios (e.g., McKinnon 1979 Ch. 10, 1982, 1984). Currency substitution may either be direct or indirect. Direct currency substitution occurs when economic agents, e.g., expect a depreciation of their home currency and shift into foreign currency. McKinnon does not think this kind of currency substitution to be dominant, and empirical research does indeed give no reason to attach much weight to it (cf., e.g., Laney, Radcliffe and Willett 1984, Batten and Hafer 1984, Batten and Hafer 1985). McKinnon's argument hinges on indirect currency substitution. This takes place through capital movements. His reasoning is as follows. Let us assume that at a certain moment in time economic agents suddenly expect the home currency to depreciate. The international capital market is perfect and interest rates adjust to take account of the expected depreciation. All this may happen without any capital flows actually taking place. But with the new, higher domestic interest rates portfolio balance is disturbed. Home residents want to move out of money and into bonds, in the process exerting downward pressure on the rate of interest. In the rest of the world the converse happens, if the home country is big enough to influence interest rates abroad. The interest rate differential is in this way pushed below the value reflecting the expected depreciation. Consequently, it becomes attractive to buy foreign bonds. Capital exports occur until the domestic money supply is
reduced to the point where it is willingly held at the increased rate of interest, i.e., where portfolio balance is restored. In the rest of the world the money supply has risen and again is willingly held, at a reduced rate of interest. All this takes place at spot exchange rates that are held constant. McKinnon's message is indeed that exchange rates should be held constant. He further assumes that the world money demand function is stable in the sense that a stabilisation of world money supply growth results in a stabilisation of the world rate of inflation. In order to stabilise world money growth, the leading industrial nations, the United States, Japan and the Federal Republic of Germany, should act together. They should, in particular, coordinate their domestic credit expansion. Liquidity inflows or outflows through the balance of payments should, moreover, not be sterilised. If one country sterilised, the world money supply would be affected (this is what happens in a key-currency system where international reserves are held in the form of interest-bearing debt of the key-currency country). If both countries sterilised, portfolio balance within a country might be precluded at the given rate of exchange, resulting in a continuous capital flow (see on sterilisation and the money supply in a two-country model De Grauwe 1983). Depletion of foreign-exchange reserves and exhaustion of international credit will put an end to this and to stable exchange rates. Apart from the question of stable exchange rates, a stable growth of the world money supply is needed to prevent inflationary or deflationary pressures.

McKinnon's proposal is intriguing, but one wonders if the relationships stressed by him are crucial enough to make the system work in practice as envisaged by him. For one thing, it is doubtful if one can meaningfully speak of a world money demand function and, if so, whether it is as stable as McKinnon asserts (Spinelli 1983). For another, interest rate differentials between countries seem to reflect differences in rates of inflation rather than expected short-term exchange-rate movements (Goldstein and Haynes 1984). Furthermore, McKinnon somewhat off-handedly assumes that capital flows will accommodate any trade or current account imbalance without any problem. Be that as it may, the empirical evidence thus far does not corroborate McKinnon's explanation of money demand instability. But his attempt to spell out the preconditions for exchange-rate stability must be applauded. It must be noted, finally, that in McKinnon's analysis of indirect currency substitution, money demand is a stable function of the rate of interest. Money demand may be unstable, the money demand function is not. It is rather the bond demand function that shifts.
The rate of exchange equals the price level in one country of the interaction which makes the price level the result of real money demand and nominal money supply. The second one is the purchasing power parity theory, which says that the price level in one country is equal to the quantity of currency, to which most international transactions are recorded. 

In both cases, the monetary theory of exchange rate determination states that the supply of money must equal the rate of exchange, and the exchange rate is determined by the demand for and supply of foreign currency, which causes the rate of exchange to rise. The rate of exchange is a price, the price of foreign currency, which affects the rate of exchange to be equal to the rate of exchange multiplied by the demand for the foreign currency. The exchange rate is determined by the demand for and supply of foreign currency, which affects the rate of exchange to be equal to the rate of exchange multiplied by the demand for the foreign currency.

A different role for money is found in the monetary approach to the exchange rate. Money is used to purchase foreign assets, and the exchange rate is determined by the demand for and supply of foreign currency. The exchange rate is determined by the demand for and supply of foreign currency, which affects the rate of exchange to be equal to the rate of exchange multiplied by the demand for the foreign currency.
building block introduces rational expectations and interest parities. Different inflation rates in different countries will result in different nominal rates of interest. Under interest parity any difference in interest rates must be reflected in a premium or discount on forward exchange. With rational expectations the forward exchange rate will equal the expected future spot rate, with expectations based on (current or expected) inflation rates. In this way all elements fit together very elegantly, but with highly restricted explanatory power. Empirical studies suggest that actual price and exchange rate movements have not fulfilled the conditions for PPP in the period with floating exchange rates beginning in 1973, or rather 1971, whatever the verdict on the preceding period with a fixed peg system may be (cf. Genberg 1978, Frenkel 1981, Frankel 1985). Even the Law of One Price, which says that similar traded goods have the same price, at ruling rates of exchange, in different countries, does not seem to be valid (cf. Spitäller 1980, De Roos 1981, Zeelenberg 1985 Ch. 4). Fulfilment of the Law of One Price is a necessary, though not a sufficient, condition for PPP to be valid. So non-fulfilment of the Law of One Price should be enough to put paid to PPP. On theoretical grounds PPP is suspect as well. Apart from index number problems, it is to be expected that, even if the Law of One Price were valid, price relationships between tradeables and non-tradeables diverge between countries (as explained by Balassa 1964). This problem could only be overcome if prices of identical factors of production were the same everywhere, which means that PPP primarily has value as a theoretical model for thinking things through for the very long run (cf. De Roos 1985 pp. 28-39). All this is not to deny that the simple form of the monetary approach to exchange rate determination can provide a useful framework for explaining exchange rate movements in a short, confined period of time during hyperinflation (cf. Frenkel 1978). Nor can it be denied that in the longer term differences in inflation rates tend to be reflected in exchange-rate movements, even if there is no one-to-one relationship (cf. Officer 1980).

In the simple monetary approach to exchange rate determination, the rate of exchange is not determined by flows, as in the Keynesian income-expenditure (IS/LM) models, but by stocks of assets. This asset approach is not confined to the simple monetary model. Other models are based on the same idea. In portfolio models, which are useful to explain short-term exchange rate fluctuations where the influence of the current account can be neglected, the rate of exchange depends on the demand for foreign assets (bonds), given the supply of domestic money and domestic bonds. For explaining exchange rate movements in the longer term, the current account cannot be neglected. Full equilibrium can only exist when both the current account and the capital account
are in equilibrium. With fully floating exchange rates any disequilibrium in the current account involves a disequilibrium in the capital account, adding to or subtracting from the stock of assets held by a country's residents and in that way influencing the rate of exchange. Building a model with both the capital account and the current account fully spelled out is far from simple, but there are a few examples (e.g., Dornbusch and Fischer 1980, see also Krueger 1983 ch. 5).

One feature emphasised in recent work on exchange rates is the phenomenon of overshooting. After a change in the data of the system, the rate of exchange moves beyond its new equilibrium value, to revert to it later. Overshooting may go some way to explain the erratic movements of exchange rates after 1973. It results from slow adjustment on at least one market. In an IS/LM model it may result from slow adjustment of imports and exports to an exchange rate change. In order for a depreciation to improve the current account it may in consequence be necessary to depreciate by a large amount at first and appreciate to some extent later. In a portfolio model one can imagine that, e.g., the domestic money supply increases. The rate of interest falls and economic agents demand more foreign bonds. This drives the rate of exchange up, improving the current account in the process. The supply of foreign bonds increases and the rate of exchange will fall again. Finally, Dornbusch has developed a model in which a change in the money supply results in overshooting because of sticky prices in the short term. In the long run an increase in the money supply will push both the domestic price level and the rate of exchange up. In the short term prices do not rise and the interest rate falls as a result of the increased money supply. Dornbusch assumes interest rate parity. A lower domestic interest rate involves a premium for the domestic currency on the forward market. Given the expected depreciation, a premium can only occur if the domestic currency initially depreciates beyond its future equilibrium rate. Note that rational expectations are assumed: investors are certain about the effect of the increased money supply on the domestic price level and the future equilibrium exchange rate.

Attempts to explain the turbulent exchange rate movements since 1973 have spawned a plethora of models, many of which provide useful insights in some aspects of real-world phenomena. Many empirical developments remain baffling, however, such as the gyrations of the dollar.
IX. EPILOGUE

It appears that many promising developments are going on within the field of monetary theory. They range from further work on basic microeconomics to attempts at explaining real-world exchange rate movements to proposals to change present monetary systems. In the micro-economic sphere, there is a continuing struggle to break loose from the Walrasian framework, a struggle that arguably now bears some fruit in the sense that it provides results that are interesting for the profession as a whole rather than only for a small band of insiders. But further research is needed before we can answer, e.g., questions such as whether it is sensible to accept disequilibria in the (Walrasian) money market. In the exchange-rate field much interesting work is going on, but it may be called somewhat disturbing that a multitude of models is built upon what appears like ever-changing sets of ad-hoc assumptions. As yet there is no such thing as a common framework. As for subjects like crowding out, that is to a large extent a matter of econometrics, but much thought has also gone into integrating the government budget restriction into the basic IS/LM-model.

If one thing looks certain, it is that in a few years' time a survey on monetary theory will have many new developments to point at.
BIBLIOGRAPHY


First ed. 1817.


H. Visser, New Classical Macroeconomics as Seen by an Impressed Monetarist Believer on Keynes and the Classics All Over Again, SKM, Tilburg 1984.


A quarterly econometric model for the Price Formation of Coffee on the World Market

Demand and Supply of Natural Rubber, Part I

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Soft Spatial Econometric Causality Models

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Multiple Rank Correlation Analysis