A GENERAL EQUILIBRIUM ANALYSIS OF MONETARY POLICY

PREFACE

The discussion that follows has grown out of my teaching of monetary economics. It is mostly of course restatement and some reformulation. There are also some applications of general equilibrium models to some South African monetary developments. Despite the familiar ground the paper covers I hope readers may still find the discussion fresh.

The paper was originally formulated as a possible introductory chapter to a book length study on monetary economics in a South African context. Other proposed chapters are some further analysis of the characteristics of money, the history of monetary policy in South Africa, an analysis of the present day South African financial structure and a more detailed critique of the recent applications of monetary policy etc.

I would be extremely grateful for any comments and criticisms of the paper. I would also value opinions as to whether the paper has sufficient merit to stand on its own.

I am indebted to Mr. David Rush who very kindly draughted the diagrams.

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Characteristic of any economic system is the ultimate dependence of all economic units on each other, as consumers, producers and the providers of factor services. It is scarcity that enforces competition for goods and co-operation between factors of production.

The task for any economic system faced with the problem of unavoidable scarcity is the reconciliation of self-serving economic behaviour. The mechanism for solving the economic problem could be one of largely exchange relationships, of quid pro quos between buyers and sellers. The "traders" of the exchange system make contact within a structure of markets with a separate market for every economic good. The market registers individual offers to buy or sell at different prices. However, any offer is conditional on the offers of all other buyers and sellers because of opportunities to consume or produce substitute goods. It is the role of market prices to register information for all decision makers about the conditional preferences and intentions of their competitors.

G.L.S. Shackle's explanation of the interdependence of economic conduct and the role played by markets and prices in revealing and resolving competition carries characteristic strength.

".....When we confine ourselves to the economic model, the publicly available and general basis for choice consists in the prices of all goods; which prices signal to all members of society the fact and implications of particular conduct on the part of others. Upon this all-pervasive web of communications rests the most important single fact which economics has to convey, namely the universal interdependence of the conduct of human beings....."(1)

The market price of any good is naturally affected by both the forces of supply and demand. Any excess of demand over supply will tend to force prices up and time and excess supply prices down. The equilibrium price is that price that balances the forces of demand and supply, the price that will serve to eliminate excess demand or supply.

(1) G.L.S. SHACKLE, "A Scheme of Economic Theory" (CAMBRIDGE 1965), p.25.

Equilibrium in any one market is not established in isolation but is influenced by fluctuations in the prices of goods being established in any and all the other markets of the economic system. Therefore equilibrium in any market will be dependent upon simultaneous equilibrium in all other markets. Such simultaneous equilibrium in every market is known as a general equilibrium and represents, conceptually, an exchange systems resolution of the scarcity problem. The general equilibrium conception is, however, an essentially timeless one. The time the system takes to effect 'complete adjustment' is of no importance for the analysis. As Shackle explains, it represents the '.....perfect and complete adjustment of every-thing in the economy to everything else, a general equilibrium attained after no matter how long a time.....' (2)

Despite its revealing emphasis on the interdependence of economic conduct the general equilibrium solution is a prospect remote from reality. Indeed the general equilibrium solution may be even conceptually unattainable if the market mechanism is taken with L.M. Lachman to be '.....a process of continuous change subject to both unexpected change as well as the inconsistency of human plans .....',(3) or, to quote Shackle once again, '..... the problem of general unemployment has taught us that economic conduct is a response not only to scarcity but also to a circumstance at least as imperious namely, uncertainty (4).

The exclusion of uncertainty makes economic decision making devoid of its essential "non-mechanical" character. All production and consumption plans are realized over time on the basis of a view of future prices. That these future prices cannot be kn own with certainty requires all sellers to establish their own prices. It makes the economy a system of price makers rather than one characterized by the comparatively impotent price takers of perfect competition and pure general equilibrium theory.

It is indeed not knowing what the future will bring for certain that is thought to be responsible for a voluntary demand for money. Sir John Hicks has argued that the transactions demand for money, i.e. the use of money as a medium of exchange is essentially involuntary, money being

transferred/...

(2) G.L.S. SHACKLE, "Recent Theories concerning the Nature and Role of Interest, in The Nature of Economic Thought" (CAMBRIDGE 1966), p.227. See further SHACKLE (1965), op. cit. especially Chapter II.

(3) L.M. LACHMAN, "Methodological Individualism and the Market Economy in Essays in Honour of Frederick A. van Hayek, p.91.

(4) G.L.S. SHACKLE. The Hedgehog and the Fox in The Nature of Economic Thought, Roads to Freedom", op.cit. p.22.

transferred and received automatically in order to circulate a volume of goods. Hicks takes the precautionary demand for money to account for the voluntary component of money holdings. Economic units prefer to hold part of their assets in the form of money because of uncertainty about the time pattern of their money inflows and outflows. Money is a liquid store of value with negligible transactions costs and is held as a precaution against the possibility of running out of money. Keynes' speculative motive for holding money is for Hicks more realistically satisfied, in a developed financial system, by a generally more liquid portfolio rather than by the all or nothing choice of liquid money or illiquid bonds. A liquid asset being one that is certainly realizable at short notice without loss. (5)

If all future prices and events were known with certainty there would be no need to postpone any dispositions of purchasing power or the sale of goods. Contracts would be established for all future deliveries and payments. Therefore in such circumstances there could be no possibility of general excess supplies or unemployment of factors of production. In an uncertain world contracts are made for forward delivery and payment but are a measure designed to reduce the uncertainty facing traders. In practice, future markets in commodities are confined to relatively short periods, i.e. to something like the foreseeable future, because of the hazards of taking a long view. Developed financial markets provide opportunities to borrow and lend for much larger period. This is possibly because the demand for and supply of credit is far more stable, more predictable and price fluctuations therefore more limited than, say, the demand for and supply of sugar or copper, the prices of which are subject to much wider fluctuations.

Despite its remoteness from reality the general equilibrium solution can be imagined as an ideal to be pursued continuously by the authorities. Where the very general objectives of stabilization policy may be taken to be the avoidance of the wastes of excess supply. (6)

Stabilization policy measures intervene in the markets of the economy to stimulate more rapid adjustment in what are taken to be appropriate directions. The time the economic system naturally takes to eliminate excess demands or supply is the essential rationale for intervention. For political reasons the adjustment process might otherwise without prompting take an intolerably long period of time. (There is, however, the further responsibility that the prospect of intervention may itself undermine the efficiency of the adjustment

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(5)/ See JOHN HICKS, "Critical Essays in Monetary Theory" (OXFORD 1967), The Two Triads, Lectures 1 - 111, pp 1 - 60.

(6) For a discussion of the objectives of stabilization policy see further below pp. 27-28.

process. It may for example make for less flexible prices.)

To be successful the stabilization authorities would need an
information system that is able to reveal where the economy is going and how
soon it will get there. They would have to be able to predict the effects
of their own interventions.

The authorities would moreover be concerned with rather different
objectives than those of the individual traders. The authorities may concern
themselves with the absolute level of prices and/or the level of wages, interest
and exchange rates. They may concern themselves therefore with the nominal
supply of money.

The rational economic man will be concerned only with relative prices
and real holdings of money. He will not in other words be affected by 'money
illusion'. (7)

While it may be the unpredictability of economic behaviour and events
that justifies and necessitates intervention the same unpredictability reduces the
possibilities for successful stabilization. Stabilization policy must operate
on the basis of reasonably predictable economic behaviour. It the system is
not that predictable then any policy measure, with due account of the time it
must take to work its way through the system, may prove to be destabilizing
rather than stabilizing. Economic conditions and economic trends when the
policy does take effect may prove so very different as to make the policy
quite unsuitable. Indeed the time lag for the operation of the policy may
itself be unpredictable.

If designed with suitable aggregation to eliminate superfluous detail
the imaginary solution of a general equilibrium model may have considerable
explanatory power. Even if the statement of the conditions necessary for a
general equilibrium cannot explain or illuminate the full interaction mechanism
by which the general equilibrium could be reached.

The familiar method used to describe the interdependence of the
different markets of the economy is a set of demand and supply functions
describing very broadly the forces operating in various aggregated markets together
with the equilibrium conditions. (8)

The analysis/...

(7) See DON PATINKIN, "Money Interest and Prices", 2nd edition, (Harper and
Row 1965) especially pp 298 – 302.

(8) See inter alia BENT HANSEN, "A Survey of General Equilibrium Systems",
McGraw Hill (New York 1970).

The analysis that follows first is a somewhat less abstract description of general equilibrium with perhaps more self-explanatory force. (9)

The economy is described as a matrix of interdependent sectors and aggregated markets. There is a government sector, a household sector, a sector for firms and another for banks together with a foreign sector. The sectors trade in some four aggregated markets. For a representative financial security in the securities market, a representative commodity in the commodity market and for money and foreign exchange in the money market. There is in addition a market for factor services, which, for reasons that will be indicated, is not directly represented on the matrix.

The representative financial security can be assumed to be of average riskiness and time to maturity. Thus justifying a description of 'the rate of interest' on loanable funds. The representative commodity is similarly a weighted average commodity produced and consumed in the economy. Changes in the price of the commodity is therefore equivalent to a change in the price level. The factor service in the model is again of representative productivity. Money in the system is of two varieties. Money created by the central bank and bank deposits supplied by the banking system. The function of financial intermediation is represented by the banks who supply bank deposits to firms and households for the purpose of financing a portfolio of financial securities.

The open economy is assumed to trade with the rest of the world via a system of fixed exchange rates. Firms pay for imports and receive payment for exports mainly in the domestic currency. Foreign exchange holdings are therefore largely concentrated at the central bank.

The matrix can be assumed to capture the economy in a moment of general equilibrium. This situation has been reached by the appropriate adjustment of prices and quantities, interest rates and incomes and the money supply. It may also be assumed that stabilizing action by the monetary authorities has also been employed. The items in the columns of the matrix reflect the flows of commodities securities and money on and off the various markets over the period. The time period may conveniently be described as the elapse of time between this and the previous state of equilibrium. The equilibrium is thus one in the ex-post sense. That the various columns all sum to zero indicates that all markets have been cleared and that therefore the reconciliation of all expected and realized magnitudes has been affected.

As mentioned/...

(9) The matrix has been adapted from a similar analysis by Robert A. Mundell. See Robert A. Mundell, "International Economics", (The Macmillan Company, New York 1968), Chap. 18, Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates. See also Patinkin (op. cit) especially p.202.

AN OPEN ECONOMY WITH FIAT AND BANK MONEY.

MARKET / SECTOR	COMMODITIES		SECURITIES		CASH		BANK DEPOSITS	
GOVT.	$\begin{bmatrix} \text{SPENDING} \\ - \\ \text{TAXATION.} \end{bmatrix}$	+	$\begin{bmatrix} \text{DEBT RETIREMENT} \\ - \\ \text{DEBT ISSUES} \end{bmatrix}$	+	$\begin{bmatrix} \text{MONEY DESTROYED} \\ - \\ \text{MONEY CREATION} \end{bmatrix}$		$\propto$	$= \bigcirc$
	+		+					
FIRMS	$\begin{bmatrix} \text{INVESTMENT} \\ \text{SPENDING} \end{bmatrix}$	+	$\begin{bmatrix} \text{REPAYMENT OF DEBT} \\ - \\ \text{BORROWING} \end{bmatrix}$		$\propto$	+	$\begin{bmatrix} \text{INCREASE} \\ \text{DECREASE IN} \\ \text{DEPOSITS} \end{bmatrix}$	$= \bigcirc$
	+		+				+	
HOUSE-HOLDS	$\begin{bmatrix} - \text{SAVINGS} \end{bmatrix}$	+	$\begin{bmatrix} \text{SECURITIES BOUGHT} \\ - \\ \text{SECURITES SOLD} \end{bmatrix}$	+	$\begin{bmatrix} \text{HOARDING} \\ - \\ \text{DISHOARDING} \end{bmatrix}$	+	$\begin{bmatrix} \text{INCREASE} \\ \text{DECREASE IN} \\ \text{DEPOSITS} \end{bmatrix}$	$= \bigcirc$
	+		+		+		+	
FOREIGN	$\begin{bmatrix} \text{EXPORTS} \\ - \\ \text{IMPORTS} \end{bmatrix}$	+	$\begin{bmatrix} \text{CAPITAL INFLOW} \\ - \\ \text{CAPITAL OUTFLOW.} \end{bmatrix}$	+	$\begin{bmatrix} \text{DECREASE} \\ \text{INCREASE IN FOREIGN} \\ \text{EXCHANGE RESERVES} \end{bmatrix}$	+	$\begin{bmatrix} \text{DECREASE} \\ \text{INCREASE IN NON-} \\ \text{RESIDENT DEPOSITS} \end{bmatrix}$	$= \bigcirc$
	+		+		+		+	
BANKS	$\propto$	$\begin{matrix} + \\ - \end{matrix}$	$\begin{bmatrix} \text{NET LENDING} \end{bmatrix}$	+	$\begin{bmatrix} \text{INCREASE} \\ \text{DECREASE IN CASH} \\ \text{RESERVES} \end{bmatrix}$	+	$\begin{bmatrix} \text{DECREASE} \\ - \\ \text{INCREASE IN DEPOSIT} \\ \text{LIABILITIES} \end{bmatrix}$	$= \bigcirc$
	$\parallel$		$\parallel$		$\parallel$		$\parallel$	
	$\bigcirc$		$\bigcirc$		$\bigcirc$		$\bigcirc$	

$\propto$ = NEGLIGIBLE.

As mentioned previously the matrix reflects no column for factor services. Excluding a column for the factor services market enables the diagram to reflect the commodities market as influenced by the familiar net injections and leakages rather than by what would be more cumbersome gross quantities.

Households supply all the factor services employed by the firms to produce commodities. Total domestic output is equal to total domestic incomes of all categories including profits for entrepreneurial services supplied by the households. It is assumed that firms undertake no direct savings and thus distribute all profits. It is also assumed that all taxes are taxes on households income. The difference between the households after tax incomes and their expenditure represents household saving and is a net leakage of demand from and a deflationary influence on the commodities market. It is essentially the difference between the households production of goods and their consumption. The households and firms consume public goods financed by taxation. If government achieved a tax surplus this would be a form of forced saving.

Investment by the firms is the difference between the total output of all firms and their total sales to the other sectors over the period. Thus actual and desired investment could be in the form of increased supplies of the producer goods (capital) or increased inventories of final goods. It represents a net injection of demand for commodities. Firms both create goods and incomes and demand part of their own production.

The rows of the matrix reflect the balance sheet items and identity of the various sectors at the same moment of time. By definition balance sheets alwys balance. This naturally says nothing about the balancing being unfavourable or favourable. A movement along the respective rows of the matrix illustrates the impact of the different sectors on the various markets. The first column of the first row shows the influence of the government sector on the commodities market. The net impact is expansionary for a government deficit, spending greater than taxation, and deflationary for a government surplus. A movement across to the second row of the column shows that any government deficit could have been financed by the sale of government securities with obvious implications for the security market. Alternatively, the possibility is indicated of a tax surplus being applied to reduce the government sectors indebtedness. Moving further across the row allowance is made for the further possibility of a tax deficit and for debt retirements being financed by money creation (reductions in government balances with the central bank) It is also indicated that any reduction in the money supply requires a tax surplus and/or additional debt issues.

The analysis/...

The analysis emphasizes the interdependence of monetary and fiscal policy. If fiscal policy measures are taken to be concerned with the direct impact of government spending and taxing on the commodities market, then it is only in the event of a fully-balanced government revenue and expenditure account that fiscal policy will have no automatic repercussions for the security and money markets.

A movement along the second row of the matrix show that forms of investment spending may have been financed by increased borrowing in the securities market or by running down bank deposits. Had the firms on balance been reducing their physical capital it is indicated that the proceeds of such disinvestment could be used to repay debts or build up money balances. Again there is a further possibility indicated of firms increasing their borrowing for the purpose of building up money balances.

Turning to the household sector in the third row it is shown that households extra savings over the period could have been held in the form of financial securities issued by firms or government or exchange controls permitting, foreign borrowers. Again it is indicated that extra savings could be hoarded in the form of increased holdings by households of cash or bank deposits. On the other hand, if the households on balance dissaved over the period the diagram shows that such extra demand for commodities (the dissavings of household would appear with a positive sign in the first column of the row) could be financed by dishoarding cash or deposits or $\cdots$ by a /net release of securities.

Proceeding to the foreign sector in the first column exports are seen to inject demand for domestic output (+) while imports increase supplies (-). The balance of trade could be either positive and stimulating or negative and deflationary. A movement along the row indicated that the balance of trade surplus or deficit could be financed by net foreign lending (capital inflow and a demand for securities) or borrowing (capital outflow). Or, alternatively, by increases/decreases in foreign exchange reserves and/or non-resident deposits with the banking system. Again the possibility is allowed for of foreign borrowing or lending, affecting the balance of payments independently of the trade account of the balance of payments. In which circumstances foreign exchange and/or non-resident deposits would again be oppositely affected.

The row for the banking sector shows the balance sheet identity for all banks. The net increase/decrease in the banks deposit liabilities must be equal to the increase/decrease in the banks security portfolio (their net lending either positive or negative) and/or their cash reserves. There is the further possibility that in a banking system with variable cash reserves, either because of an absence of fixed cash ratios or through policy designed variations of them, banks may increase/decrease their lending by reducing or

increasing their cash reserves.

The commodity market column reflects the familiar condition for equilibrium. The market is in equilibrium when the sum of injections is equal to the sum of leakages, i.e. government plus investment plus export expenditure equal to taxes plus savings plus imports $(G + I + X = T + S + M)$. There will be no further pressure on prices and/or quantities of output when this condition is met. Similarly the securities market will be in equilibrium with no further pressure on the rate of interest, when the flow of securities on to the market from government firms, households and foreign sources is just equal to the preferred accumulation of securities by households, the foreign sector and the banks. Looking down the cash column it may be seen that increases or decreases in the cash base of the system can originate with decreases/ increases in the government balance with the reserve bank and increases/ decreases in foreign exchange holdings. The equilibrium condition in the column for bank deposits reflects the voluntary nature of the demand for and supply of bank deposits. Banks supply a preferred quantity of bank deposits which will depend on the cost of and rewards from so doing, and the private sector has a preferred demand for bank deposits. Any excess supply of nominal deposits held by firms or households will be exchanged for commodities, local or imported, or securities, domestic or foreign, or possibly for cash itself. Such attempts to reduce the nominal holdings of deposits will have repercussions for prices and/or outputs and interest rates and so will effect the real supply of and demand for deposits itself.

As was mentioned earlier the analysis ignores the important consideration of the more precise form of the functions that make up the model, e.g. the investment, saving, tax, money supply, import, security functions. It also cannot say anything about the workings of the interaction mechanism which establish general equilibrium. It does not indicate the sensitivity over time of the markets to changes in interest rates, prices and quantities, wages and money supply, etc.

The analysis merely assumes that a general equilibrium solution exists and that the system is dynamically stable, i.e. by the normal functioning of the system it is capable, over time, of reaching such a solution.

Again the object of the exercise is to emphasise that the impact of a change in the supply and demand conditions anywhere in the economic system are most unlikely to be confined to that market or sector.

To answer some of the issues raised above some more formal general equilibrium analysis will be considered. A framework will also be established for the application of general equilibrium analysis to issues of monetary and stabilization policy in a mainly South African context.

Don Patinkin in his "Money, Interest and Prices" (10) employs a somewhat more simplified general equilibrium system with the following broad characteristics. The model consists of three sectors: government, households and firms. The sectors trade in four markets in four representative goods. Commodities of both consumption and investment varieties, bonds which are fixed interest perpetual annuities, labour services and money. Money is the non-interest bearing and only debt of the government sector. The money supply was issued in previous periods to finance government deficits. In the present and more normal times the government balances its budget. The government sector purchases final goods from the firms and public goods are distributed without charge. The firms are all fully vertically integrated and thus sell only finished goods. Only firms issue and retire bonds which are held by households.

The model is a short run model of a closed economy with conditions of perfect competition prevailing in the commodity and labour markets. The effects of additions to the physical stock of capital can be consequently ignored so as to exclude any problems of growth abd business cycles. The changes in wealth that do influence the working of the model are changes in the real stock of financial assets, i.e. variations in the real value of money. It is the effect of changes in real balances that integrates all the markets of the system. The reactions to changes in the price level are not confined to the money market but also affect real wealth and so real demands and supplies in the other markets and so the rate of interest and relative prices.

The model may be described using largely Patinkin's (11) own notation by the following four equilibrium conditions for

the four/...

(10) PATINKIN, op. cit. Chapter IX

(11)   "   "   page 229

the four markets.

Equilibrium Condition

		Market
(1)	$N(w/p, Ko) = R(^w/p)$	Labour Services
(2)	$F(Y, r, ^{Mo}/p) = Q(^w/p, Ko)$	Commodities
(3)	$B(Y, ^1/r, ^{Mo}/p) = 0$	Bonds
(4)	$L(Y, r, ^{Mo}/p) = ^{Mo}/p$	Money

w represents money wages, p the price level, Ko the given stock of capital, Y gross output or income, r the interest rate and Mo the given stock of money. The N,R,F,Q,B and L respectively note the demand function for labour, the supply function for labour, the aggregate demand funtion for commodities, the aggregate production function, the excess demand function for bonds and the demand function for real money balances.

The demand function for labour, given the size of capital stock, reflects the perfectly competitive behaviour of firms who employ labour to the point where the diminishing marginal productivity of labour is equal to the real wage rate. The F function aggregates the consumption, investment and government demand functions. The Q function is the economy's aggregate supply function. The B function is the excess demand function for bonds being the difference between the households demands and the firms supply of bonds. Since distribution effects are ignored, the households initial bond holding and the firms initial bond liabilities are excluded as influences on the demand and supply functions. The final equation indicates the conditions of equilibrium in the money market, i.e. the equality of the demand for and supply of money.

The system thus consits of four equations and three dependant variables, money wages, prices and the rate of interest. The equilibrium values of which will solve the system of excess demand equations. Given the budget restraint imposed on households, by Walras' Law (12), information on any one of the aggregate demand functions can be obtained from knowledge of the equilibrium demand functions for the other three. This leaves a potentially determinate three dependent variable and three independent equation system.

Patinkin offers a geometric explanation of dynamic stabi-lity(13). The system will be dynamically stable if by the normal operation of the model any departure from equilibrium sets in motion forces that over time inevitabley restore equilibrium. To facilitate

(12) See HANSEN op. cit. p.27.

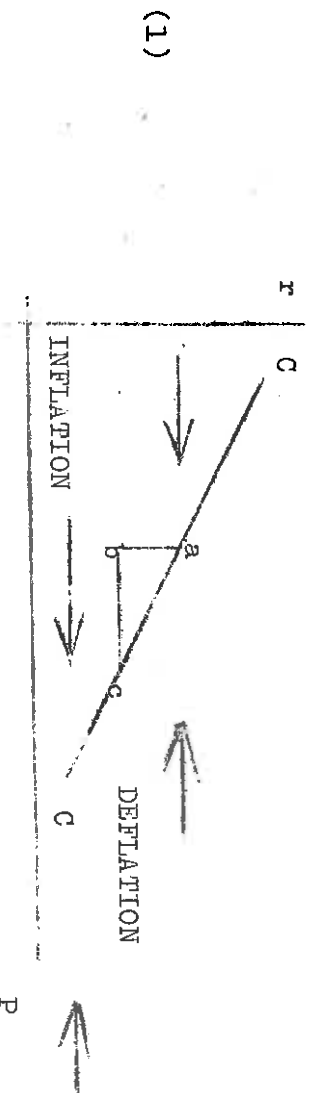(13) See PATINKIN op. cit. pp 232 - 236

a geometrical/...

a geometrical explanation of stability Patinkin makes an initial
simplifying assumption that the labour market adjust instantaneously
to any excess demand or supply.   Any excess demand for labour is assumed to
instantaneously force money wages up and excess supplies money wages down to
restore equilibrium.   The object of the assumption is to eliminate any
dynamic feedback effects from the labour to the other markets of the
system.   Such an equilibrium in the labour market is a full employment
equilibrium which also implies full employment output in the commodities
market.   The purpose of the device should not be misunderstood.   It is
merely to reduce the system for easy and therefore illuminating geometry.
It does not deny the possibility of unemployment disequilibrium situations
in the labour market but conveniently assumes that these are eliminated
instantaneously[14].

The dynamic interaction of the model are thus for diagrammatic
purposes confined to the variations of the price level and the interest
rate.   The geometry of potential equilibrium in the commodities bond and
money markets are described below.

Interest rates are measured on the vertical axis and the
price level on the horizontal.   A locus of potential equilibria for the
commodities market would then be downward, sloping.   Such a curve is
called "CC" in figure (1).

The explanation for the downward slope of CC is as follows:
Given full employment output any increase in interest rate or the price level
would be deflationary.   This by the usual assumptions that increases
in interest rates reduce investment and consumption spending.   As a
result of a reduction in real wealth an increase in the price level also
reduces spending by firms and households.   Thus as indicated in figure (1),
a decrease in interest rates from a to b would induce inflationary pressure in
the commodities market.   The excess demand for commodities would be elimi-
nated through negative real wealth effects curve by a rise in price level b-c.

(1)

r

C

INFLATION

a

b

c

DEFLATION

C

P

The diagram/...

(14)   See PATINKIN p.230

The diagram shows that configurations of interest rates and the price level to the left of CC generate inflationary forces in the commodities market and to the right of CC deflationary forces would prevail.   The respective disequilibrium forces acting as the price level to eliminate excess demand or supply are indicated.

A similar analysis may be undertaken for the bond and money markets.   The locus of potential equilibrium combinations of the dependant variables in the bond market would be positively sloped as in the 'BB' curve in figure (2).   Increases in the interest rate, from a situation of equilibrium in the bond market, will result in excess demands for bonds.   This would be the result of the increased attractiveness cet. par., of holding bonds and the increased costs of issuing them.   Increases in the price level will on balance result in excess supplies of bonds.   The relationship between cet. par. changes in the price level and the bond market is somewhat complicated.(15)

Any rise in the price level reduces the real wealth of firms and households.   This would tend to cause households to save more to restore real wealth and encourage firms to borrow more.   However in addition, with the increase in the price level, it requires more funds to finance a given level of real investment expenditure.   This is a further reason for issuing additional bonds.   Thus it may be assumed that the supply of bonds increases more than proportionately to the demand for bonds with a rise in the price level.   That is it would cause a net excess supply of bonds.   Thus as increase in the price level would serve to eliminate any excess demands for bonds caused by a rise in the interest rates.

In figure (2) an increase in the price level from a to b would result in tight credit market conditions which would be ased by a rise in the rate of interest of b c.   The diagram shows that to the left of BB easy credit conditions would prevail and to the right tight credit would rule.   The arrows are again indicate the disequilibrium forces that would prevail on interest rates in the bond market.   To the left of BB interest rates fall

(2)

(15) See PATINKIN op. cit. esp. pp. 213-221

as a result of excess demand for bonds and to the right excess
supplies of bonds would cause interest rates to rise.

A similar diagram can be constructed for the money market.
The LL curve of potential equilibrium in the money market will also
be upward sloping, (see figure 3).   Increases in the price level will
be associated in the money market with higher rates of interest.
The explanation is that higher prices, cet. par., require increased
holdings of money to maintain the same real purchasing power.
Consequently increased demands for money by both firms and households
would cause an increased supply of bonds and possibly commodities
as well as firms sought to restore preferred liquidity by reducing
inventories or output.   A sufficient increase in the rate of interest
could eliminate any excess demands for money by making money more expensive
to hold and bonds more expensive to sell.

(3)
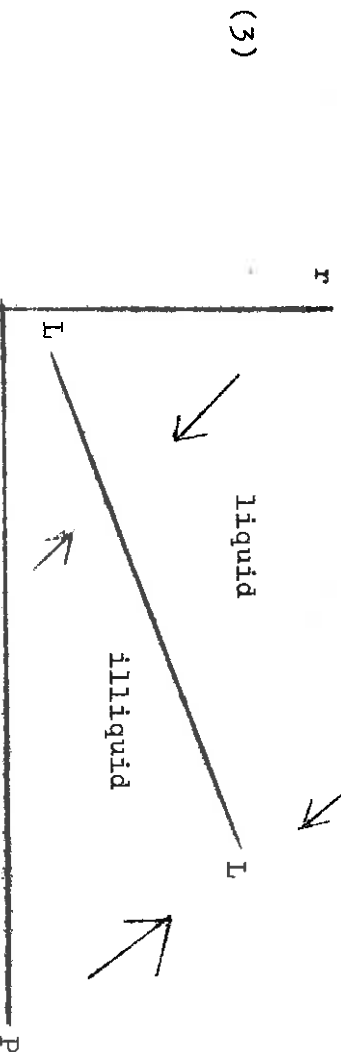
On figure 3 to the right of LL there would be general
conditions of illiquidity and excess demand for money.   To the left
conditions in the money market would be liquid, i.e. excess supplies of money.
When liquid conditions prevail in the money market prices would tend
to rise and interest rates fall.   If the money market were illiquid prices
would fall and interest rates rise. The change in prices and interest
rates in both situations must tend to restore equilibrium in the money
market.

It should be noted, that in the discussion of the money market of
the general equilibrium model, excess demand or supply there was
considered to affect both the other markets of the model.   That is
excess demand or supply of money has implications for both the interest
rate and the level of prices.   However in the discussion of the Commodity
and Bond markets a partial approach was adopted.   It was assumed that
tight or easy credit only affected the interest rate and deflationary
and inflationary forces only affected the price level.   These assumptions
are clearly not appropriate in a general equilibrium anlysis.   Easy

credit could for example lead firms to hold greater inventories and reduce the supply of goods to the commodities market. Similarly if tight credit market conditions prevailed firms may prefer to reduce inventories rather than find additional finance which would increase the supply of commodities. Thus in the bond market easy credit would tend of itself to cause prices to rise and tight credit cause prices to fall. The arrows indicating:

(4)
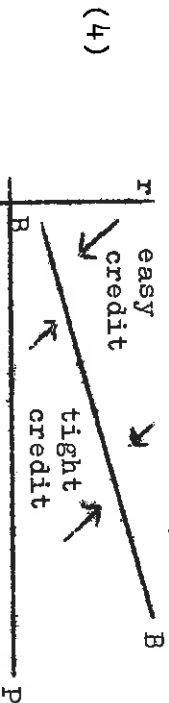
the prevailing forces in the bond market could be something like those illustrated in figure 4. Similarly in the commodities market any frustration of households in their demands for goods at prices they prefer to pay could lead them rather to buy more bonds. Similarly if firms were unable to sell all the commodities they would prefer to do at prevailing prices they might sell bonds in order to finance a larger inventory of commodities. Thus if account were taken of possible spillover effects to the left of CC interest rates would tend to fall and to the right of CC interest rates would rise. The impact of the forces of excess demand or supply on the commodities market on both interest rates and prices are indicated in figure 5.

(5)
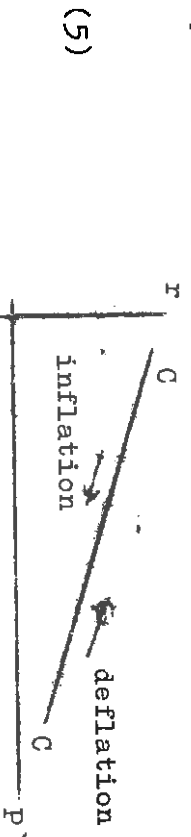
Putting the 'CC', 'BB' and 'LL' curves in figure 6 produces a description of general equilibrium and also identifies all the possible states of disequilibrium that may disturb the economy.

(6)
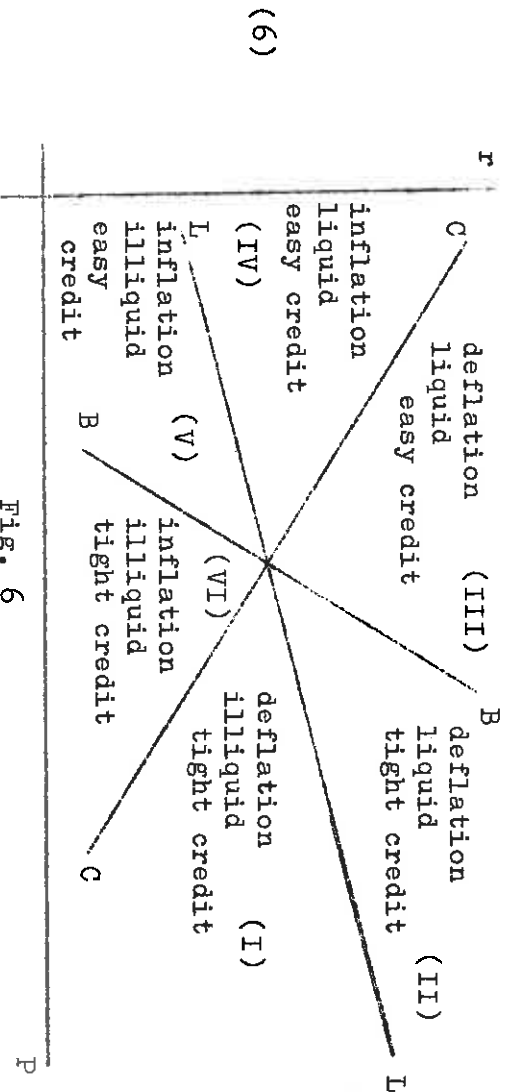
Fig. 6

By Walras' law only 2 of the excess demand equations will be independently in equilibrium at point g. If equilibrium in the money market is taken to be dependent or equilibrium in the other markets the LL curve in figure 6 must also pass through point g. In addition the curve must be flatter than BB to avoid the illogical situation, given the limited incomes of household, of excess supplies or demands in three markets simultaneously.

For the/...

For the model to be dynamically stable any departure from equilibrium must set in motion forces that inevitably restore equilibrium. Forces would restore equilibrium in all markets of the world if the balance of forces on interest rates and the price level operated as in figure 7. That is the system were to operate as if the only force causing interest rates to change came from the bond market and the only force causing prices to change emanated from the commodity market. The vertical arrow represents the direction of change of interest rates and the horizontal arrow the change in the price level. The third arrow represents the combined direction of change in both interest rates and prices. Thus in sector (i) both interest rates and prices would be increasing. In (ii) both prices and interest rates would fall, in (iii) similarly prices and interest rates fall while in (iv) interest rates decrease while prices rise in (v) prices rise while interest rates fall and in (vi) both interest rates and prices would rise. The dynamic adjustment mechanism could take the economy through all the phases illustrated in the diagram without re-establishing equilibrium. For example by starting in sector (i) and returning to (i) having proceeded in an anti-clockwise direction through all the disequilibrium phases. However, if so, the new situation established in sector (1) would inevitably be closer to equilibrium than the original one. Thus the system is on the above assumption dynamically stable. Sufficient time must restore equilibrium as is illustrated by a possible path in figure 8 from disequilibrium situation z to g.
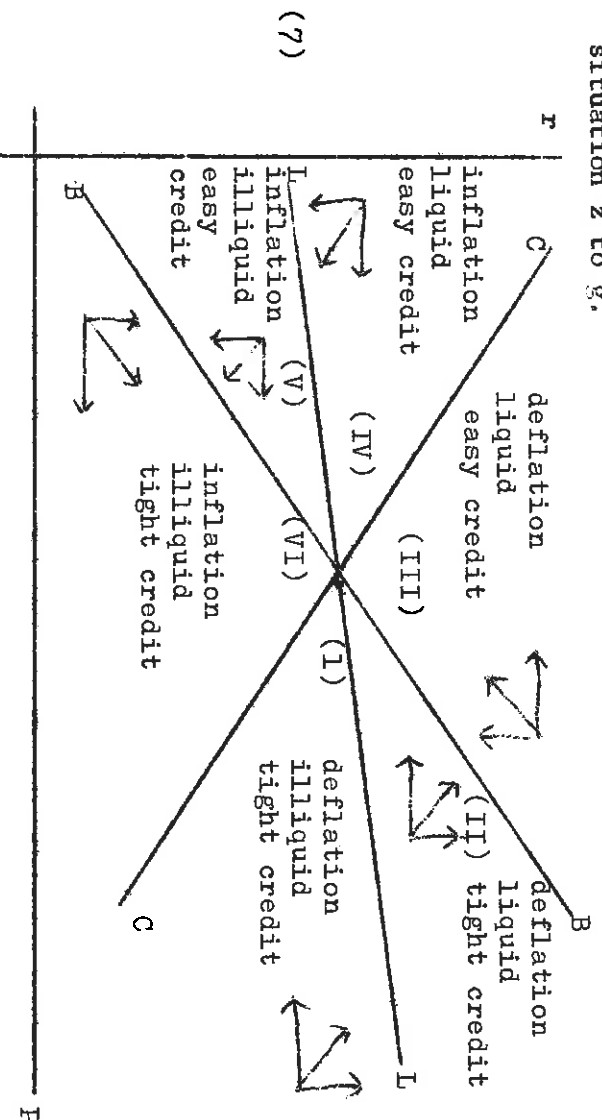
It may now be considered whether the model, allowing for the general repercussions of excess supply or demand in one market to all markets, can in fact satisfy these necessary conditions for dynamic stability. The model could be unstable if any of the arrows of figure 8 pointed in the opposite direction to the ones indicated. This would mean that the market forces in such sector would take you away from rather than towards general equilibrium g. What is perhaps of greater interest than a description of conditions for dynamic stability, is the account the analysis offers of the different markets interacting with each other.

(7)

r

C — inflation liquid easy credit

deflation liquid easy credit

(IV)

(V)

(III)

(I)

B — deflation liquid tight credit

inflation illiquid easy credit

(VI)

inflation illiquid tight credit

deflation illiquid tight credit

L

C

B

P

16.

(8)

r

c

(IV)

(V)

(III)

(II)

B   (VI)

g   z   (i)

L   B

L   c

p
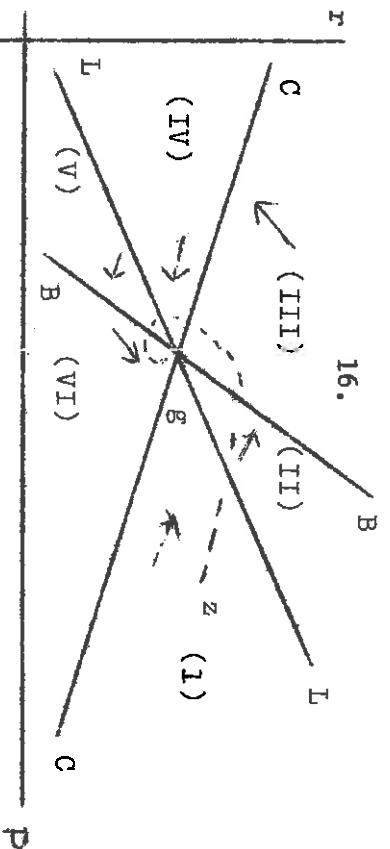
It may be again assumed that some exogenous disturbance takes the system from ρ to position z in sector (i). Here conditions of excess supply of commodities, illiquidity and tight credit prevail. In sector (i) repercussions from all markets will tend to force prices and interest rates up and so in the desired direction to restore equilibrium in all three markets (16). The forces of the market may not take the system directly to g but the economy could subsequently find itself facing conditions represented by sector (ii) of the diagram, i.e. deflation, liquidity and tight credit. In this sector some of the spillover effects will be pulling in opposite directions. The excess supplies of money will tend to cause prices to rise and interest rates to fall. That is opposite to the impact of the excess supplies of commodities and excess demand for credit that would prevail if the money market were in equilibrium. If allowance is made for spillover effects the excess supplies of commodities would tend to reinforce any rise in interest rates while the excess demand for credit would also cause prices to fall rather faster if firms were to release inventories. Therefore on balance prices will fall and interest rates rise only if it can be assumed that the strength of the forces on interest rates and prices generated by the commodities and bond market are stronger than those emanating from the money market. If prices rose and interest fell in sector (ii) the model could not be stable. In other words the model is dynamically stable only by initial assumptions about the relative strengths of forces (17).

In sector (iii) excess supplies of money will reinforce the tendency for interest rates to fall with easy credit. Again the excess supplies in the commodity market would tend to cause interest rates to rise. However the excess supplies of money would act against any fall in prices in the commodity market. In addition to the excess liquidity causing prices to rise rather than fall, the households if they came to buy commodities rather than less attractive bonds would further restrict the fall in prices. Thus again it is conceivable that both prices and interest rates would rise rather than fall. In sector (iv) all the spillover effects act to reinforce the fall in interest rates and the rise in prices. In sector (v) as in sector (ii), the

(16) To verify these points the reader is required to refer to the earlier more detailed analysis of the individual markets.

(17) See PATINKIN op. cit pp 234-236.

spillover effects from the bond and commodity markets will reinforce each other while the excess demand for money could cause prices to fall and interest rates to rise. That it opposite to the appropriate directions. Sector (vi) has similarities with sector (iii). Here the illiquidity in the money market would tend to increase the supply of goods and so act counter to the effects of excess demand on prices generated by the commodities market itself. Tight credit would be reinforced by extra borrowing to obtain increased stocks of money. Also households would relieve the shortage of credit if they came to hold additional securities rather than competed up the price of commodities. Again necessary conditions for dynamic stability in this sector would prevail if on balance interest and prices rose.

By integrating a discussion of the labour and commodity markets of his general equilibrium analysis Patinkin establishes conclusively(18) that given price flexibility and so real wealth effects the only logically consistent equilibrium is a full employment equilibrium. As Patinkin himself puts it:

"...It follows that if the terms are understood in their usual, strict sense, the coexistence of involuntary unemployment and flexible money wages precludes the existence of equilibrium. For 'flexibility' means that the money wage rate tends to fall with excess supply, and 'equilibrium' means that nothing tends to change in the system..."

"But" as Patinkin continues: "like any other theorem which is tautologically true, this one too is uninteresting, unimportant and completely uninformative about the real problems of economic analysis. It tells us nothing about the nature of the forces which generate unemployment. It tells us nothing about the relationship between the height of the real wage and existence of unemployment. And - most important of all - it tells us nothing about the central question which divides classical and Keynesian economics; the efficacy of an automatically functioning market system with flexible money wages in eliminating involuntary unemployment(19)."

In the simple Keynesian models an inadequacy of aggregate demand in the commodity market results in the accumulation of unwanted inventories and consequently a reduction in output and so in the demand for labour. Equilibrium in the commodity market is restored when stocks of inventories are no longer increasing. That is where the planned lower level of expenditure is equal to planned output at similarly lower levels.

The analysis as Patinkin argues neglects the aggregate supply function of the firms. The firms producing less output have excess productive capacity and so would naturally prefer to be able to employ

their full capacity and so be able to offer more employment.
Therefore, the planned equality of expenditure and output is not
a sufficient condition for equilibrium in the commodity market. If
an excess of preferred over actual output exists because of excess
capacity firms will tend to reduce their offer prices to stimulate
additional demand.   Such decreases in prices will in turn stimulate
real wealth effects and so increases in aggregrate demand.   There-
fore there must, be /assuming consistency and/some lower level of
                     logical.   given dynamic stability,
prices that would inevitably generate sufficient of a real wealth
effect to reverse the deflationary conditions in the commodity
market and eliminate excess supplies.

The desired output of firms is a function of the real
wage rate as well as the capital stock and productive capacity. Any
increase in real wages will reduce preferred output levels and the
offers of employment associated with each level of output.   Thus
if money wages remained constant and prices fell real wages would
increase leading to the offer of less employment at the given wage
rate.   However any unemployment, given flexibility of money wages,
will reduce the level of money wages, real wage costs, and so stimulate
increases in real output.   Unemployment in the model therefore reflects
a state of disequilibrium and, given flexibility, must tend to cause money
wages to fall.   Patinkin argues that unemployment is not necessarily
the effect of rigid wages.   An inadequacy of aggregate demand will result
in lower output and less employment offered at any given real wage rate.
That is even if money wages should happen to fall as fast as prices.
Patinkin reaches the following conclusion:

"While our interpretation takes off the analytical edge of
Keynesian economics in one direction it sharpens it in another,
more vital one.   It makes unmistakeably clear - what should
always have been clear - that the involuntary unemployment
of the General Theory need not have its origins in wage rigidities.
Indeed, in this respect we are more Keynesian than Keynes.   For by
unequivocally placing the centre of emphasis on the inadequacy of
aggreprate demand in the commodity market, and by recognising the
resulting involuntary unemployment to be a phenomena of economic
dynamics, we have freed ourselves from the necessity of static

analysis'....

(18) PATINKIN op.cit. pp 316 - 328.
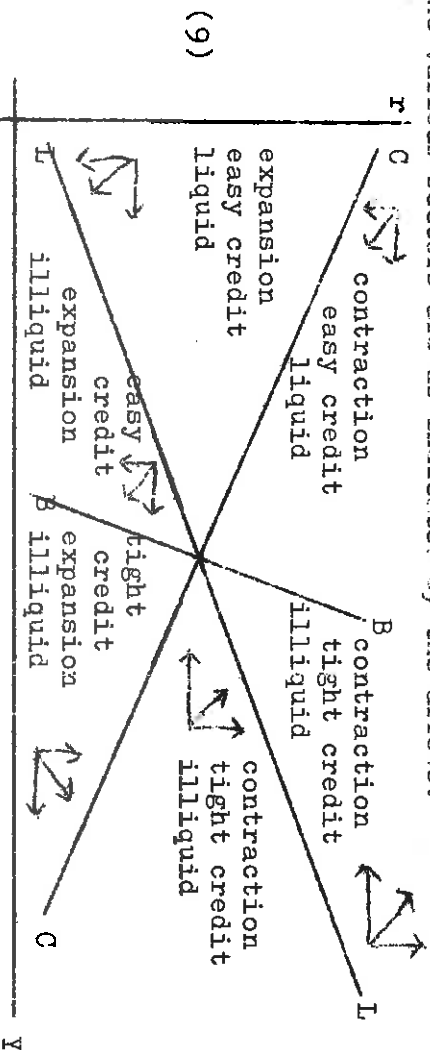
(19) PATINKIN op. cit. p. 315.

the real world will usually lie somewhere between these extremes. As Leijonhufvud points out, however, it is no easy task for the model builder to separate price and quantity effects. (24)   Milton Friedman has recently made such an attempt. (25)

A discussion of a simple Keynesian or Classical general equilibrium system may throw some light on an issue of continuing importance for South African monetary policy. That is the expected effects on interest rates of an increase in the supply of money. The analysis may be simplified by assuming that extra money is introduced into the economy without direct implications for the distribution of wealth or income.

As in the Patinkin model, the economy under discussion may be assumed to consist of four markets for four aggregated goods. For labour services, commodities, bonds and money. Let further the Keynesian type of assumption of rigid money wages and prices in the downward direction be adopted with money wages set above the level consistent with full employment. Correspondingly some excess capacity exists in the economy. However the assumption of perfect flexibility of real output could be modified. It may be taken that increases in output and income reflect in part changes in real output and partly merely increases in money prices.

Once again in the analysis that follows feedback effects from the labour to other markets will be conveniently ignored. Thus the analysis is confined to interactions between the money, bond and commodities markets. In general equilibrium only two of the three excess demand functions will be independent.

General equilibrium in a Keynesian-type framework may be represented as in figure 9 below. It may be assumed that the system is dynamically stable and that the direction of the disequilibrium forces within the various sectors are as indicated by the arrows.

(9)

C — contraction easy credit liquid
L — expansion easy credit liquid
B — contraction tight credit illiquid
easy credit expansion illiquid
tight credit expansion illiquid
contraction tight credit illiquid
expansion tight credit illiquid
r (vertical axis), y (horizontal axis)

(24) See Leijonhufvud op. cit. esp. Chap. II
(25) Milton Friedman, "A theoretical Framework for Monetary Analysis" - The Journal of Political Economy. March-April, 1970, Vol. 78 No. 2.

The dependent variables are interest rates   measured vertically and nominal income measured on the horizontal axis. To the left of CC (more familiarly known as the IS curve), excess demand forces nominal and real incomes upwards and to the right of CC excess supplies act to reduce nominal and real income. The CC curve shows that a decrease in interest rates has an expansionary influence on the commodity market while an increase in incomes increases savings (cet. par.) and is consequently deflationary. The BB curve represents equilibrium combination of interest rates and income for the securities market. The BB curve again is upward sloping, because higher interest rates result in excess demand for bonds while increased output requires additional financing and so an increase in the supply of securities issued by the firms. To the left of BB, therefore, easy credit is the rule and to the right tight credit with the indicated repercussions on interest rates.

The LL curve for the money market is upward sloping. To the left of LL the economy would be liquid and to the right illiquid. The LL curve must pass through the intersection of BB and CC and again be flatter than BB. It may be assumed that any cross effects from the money, bond and commodity markets are dominated by the direct effects of excess supply or demand on prices or interest rates. That is in other words irrespective of spill-over effects from the money or other markets if there is disequilibrium in the commodity market nominal incomes will rise or fall as if the other markets, were in equilibrium. Similarly the bond market will react as if there were no spill-over effects from the other markets.

Let it then be assumed that the equilibrium is disturbed by an injection of money. Economic units, given the momentary stability of interest rates and incomes consequently have too much money and too few bonds and commodities. Nevertheless, in the characteristic Keynesian analysis, excess supplies of money are exchanged for additional bonds alone. The commodity market is implicitly assumed not to be directly affected by the extra money. The excess demand for bonds and excess supplies of money will push the BB and LL down and to the right. At every point along the original BB curve there is now excess demand and along the given LL curve excess supply. A new general equilibrium will be established therefore at a higher level of income and at a lower rate of interest. (See figure 10 below,   and where some possible dynamic paths from the old to the new equilibrium are indicated.)
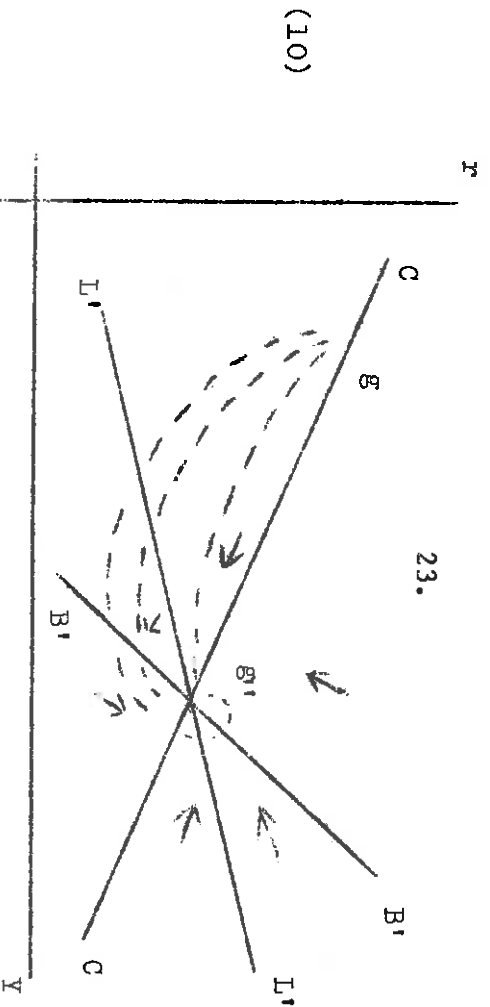
It should be noted that the effects of the increase in the supply of money are confined to interest rate effects on investment and consumption demand. It should also be noted that the fall in interest rates is moderated by the effects on the securities market of the higher level of income. Had income been less interest rate responsive (a steeper CC curve), interest rates would have fallen further to absorb the excess supplies of money.

Confining the direct effect of the injection of money to the bond market is clearly a very partial assumption. A more general treatment would allow for direct effects on spending of additional money holdings. Any rightward shift in the CC curve would further moderate any final fall in interest rates. Indeed for interest rates to be finally lower it would have to be assumed that the BB curve shifts further to the right than the CC curve. This it would do if economic units prefer to spend more of any extra money received on bonds rather than on commodities. If the increased supplies of money were spent equally on both bonds and commodities the CC and BB curves would shift equi-proportionately to the right. The ultimate effects would leave interest rates unchanged. (See figure 11 below.)

(10)

(11)
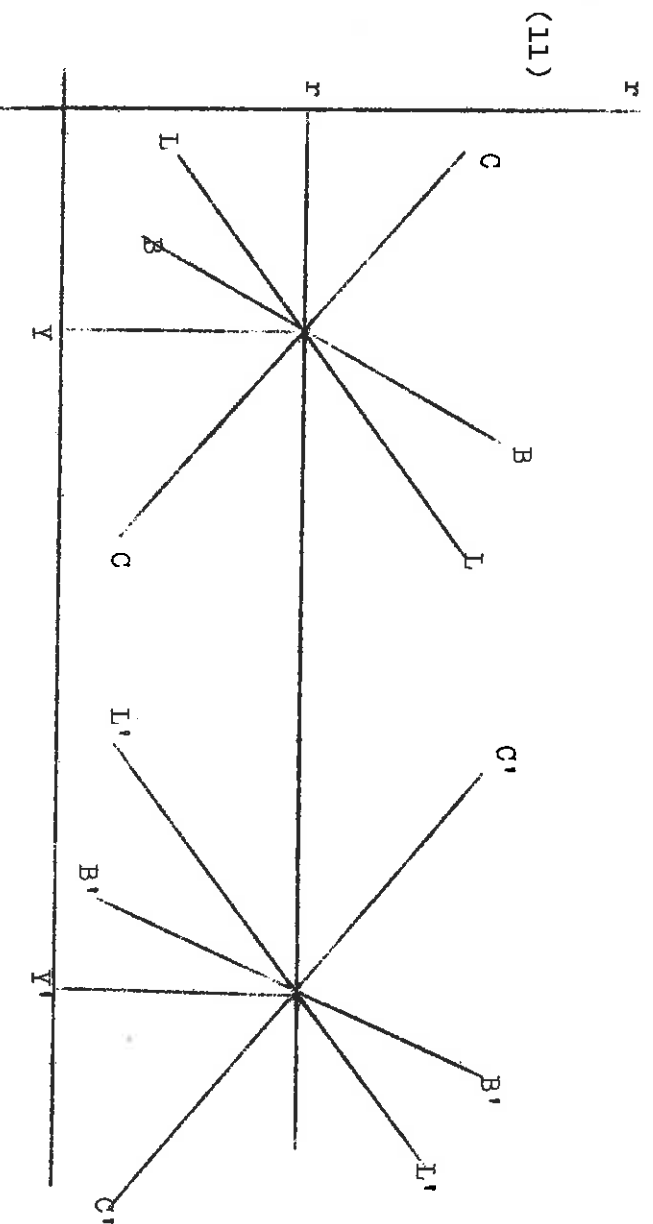
Patinkin interprets the classical theory of the effects of an increase in the supply of money in a similar way. The increase in money is assumed in the classical theory not to effect (if neutrally distributed) the relative preferences for bonds and commodities. Extra money will be exchanged equally for bonds and commodities. The assumption of full employments means that prices will rise rather than real incomes with excess demand. Equilibrium will be re-established where the increase in prices is equiproportional to the increase in money supplies. Interest rates, relative prices, real money holdings will be unchanged. The effects of money on the long-term equilibrium rate of interest and other real prices is in other words neutral (26).

Diagrammatically the analysis may be illustrated as in figure 6 by an equiproportionate shift in the CC and BB curves with prices once again measured on the horizontal axis.

It should be noted that a temporary fall in interest rates would be part of the adjustment mechanism. The fall in interest rates is reversed by the effects on the supply of and demand for securities of the rise in prices.

The obvious lesson of the classical model for monetary policy is that, in an economy where capacity is generally under pressure and where excess demand will lead mainly to higher prices, the higher prices can be expected to react back on the securities markets. Attempts therefore to pay interest rates, below levels to which the market would be taking them, by way of expansionary monetary policy are likely to be defeated by rising prices. This indeed has been the general experience of 'cheap money' policies.

In the real world where time is of the essence of economic adjustment, an influence of considerable importance for the level of interest rates and of course other prices will be expectations about the future level of prices. Hitherto, the role of expectations has been ignored in the model building.

(26) See Patinkin op. cit. Chap. X, part 3.

It was considered previously that once uncertainty and the time-consuming nature of the economic system are explicitly allowed for then all sellers face more or less downward sloping demand curves. They have, but may not enjoy, the equivalent of some monopoly power to set their own prices. Information costs may cause sellers to withhold supplies while they appraise themselves of true market conditions. Such restraint is perhaps more characteristic of labour and some commodity markets than of financial markets where information costs are much lower and where, consequently, the adjustments to excess demand or supply are much more sensitive.

If it may be assumed that the markets of our system are closer to developed financial markets ('broad deep and resilient') than to imperfect labour markets, the prices established within any defined period of time (e.g. a trading day), are still those prices that equalise demand and supply in all the interdependent markets. In other words, sellers and buyers are still price takers. They must accept the prices established on the markets, however their current supplies and demands will be influenced by their view of the future level of prices.

Any general expectation of rise in the rate of increase of prices will effect all the markets of the economic system. At any given interest or wage rate or price buyers would wish to buy or hire more and sellers would wish to sell less. Money holders at any given interest rate or price level would wish to hold less money.

In the simple Keynesian general equilibrium model illustrated above the repercussions in the bond, commodity and money markets could be illustrated by a rightward shift in the CC curve, a downward shift in the LL curve and an upward shift in the BB curve. The current level of interest rates must rise but the same rise in the rate of interest will serve to moderate the excess demand in the commodity market and so the increase in prices. This is a simple illustration of what may be called the financial constraint on any inflationary process. Therefore more inflationary expectations could not sustain an inflationary process. Increases in the money supply or its rate of utilization are required to offset the deflationary implications of rising prices on financial markets.

The effects of inflationary expectations on an isolated labour market will now be considered: If uniform expectations were held about prices on both sides of the labour market the level of unemployment would be unaffected by the expectation of inflation. In other words, real wages, if price expectations were fulfilled, would be unchanged. If the capital stock and techniques were assumed to be given the level of output would also be unaffected. Employers and employees may be assumed to be concerned about their real wage costs and benefits rather than nominal wages. The labour market will establish current money wages. At any given money wage with the

expectation of an increase in the rate of inflation expected real wages will be lower. Therefore employers will increase their demand for labour/ every given money wage rate and sellers will reduce their supplies.

Expected inflation will only increase employment, under these assumptions, if somehow the employers were predicting a faster rate of inflation than employees. Similarly, employment would decrease if employees predicted prices to rise faster than employers believed they would.

The phenomena of rising prices and wages and excess supplies of labour and commodities has made a seemingly paradoxical first appearance in some market type economies recently. In a world of price takers, as is illustrated by our labour market above, rising prices or wages can only be expected to set in motion corrective forces. The excess supplies may be the result of unfulfilled expectations about the rise in prices.

In the imperfectly competitive markets of price maker rising prices could be accompanied by general excess supplies. However, such a condition would be one of dynamic disequilibrium and could be logically be associated with excess demand for goods or labour services. However, as has been suggested, the real world may have very different characteristics to that of models of perfect competition.

Sellers set prices on the basis of what they are expected to be. In addition prices themselves are likely to be much less flexible than the quantities put onto the market. That is, the imperfectly competitive commodity and labour markets are relatively price inflexible and quantity flexible. Demand and realized sales may prove to be less than anticipated at the established prices. If so, the situation is then clearly not one of equilibrium. It may lead to some adjustment of prices or what is more likely the accumulation of additional inventory. If the excess supplies are of labour services it would tend to lead to longer waiting times for jobs. In all markets it may be expected that expectations themselves would be revised in the light of the newly-released market information. There is, moreover, no a priori reason to expect the adjustment process to be very rapid. Expectations may only gradually be reconciled to realized magnitudes, of quantities sold and bought as well as of prices. The price level may continue to rise, albeit at a slower rate cet. par., after general excess supplies have made their appearance. In other words, there may be some equilibrium positive but lower rate of growth of prices towards which the system will be groping. Clearly such an equilibrium rate of growth of prices would depend in part on differences between the rates of growth of the supply of and the demand for money.

What is needed is a development of the general equilibrium model that could explain the determination of the rate of change of the dependent variables of the model over time.   Such a model would have to offer some explanation for the formation of expectations.   It could be assumed, for example, that expectations about future quantities are dependent on past and current values of the variable and its rate of change.   However, such models would be vulnerable to Shackle's criticism of their machine-like characteristics. Future expectations that depend mechanically on past values leave no room for the influence of pure uncertainty on economic life.   (27)

An adaptation of a more conventional general equilibrium model may offer some further insights into the limitations and implications of monetary policy.   In particular the implications of the choice among alternative monetary standards will be analysed.   (28)

The choice of a monetary standard is the selection of a target amongst alternatives that then becomes the direct objective for monetary policy.   One such standard could be the familiar International standard. In terms of this standard the major goal for stabilization policy is the maintenance of the free convertibility of domestic money into international money at a fixed rate of exchange.   Monetary policy would then be directed to this end and indeed in the high tide of the international monetary system (1880-1914), most countries were successful in the pursuit of this objective.   Protagonists of the standard may consider fixed exchange rates desirable as only a means to the end of price stability.   That the requirement for convertibility defends the system and price stability against naturally spendthrift governments.   The analysis below will, however, seek to show that in certain circumstances there may be a conflict between adherence to an international standard and price stability.

An alternative objective for stabilization policy could be securing the stability of the commodities market.   That is the elimination of deflationary or inflationary pressure.   What Mundell calls the commodity standard.

A further alternative could be a full employment standard.   The objective being the full employment of labour.   Yet another alternative could be/...

(27)   See G.L.S. Shackle (1965) op. cit. esp. Chap.V.

(28)   The analysis that follows owes much to Robert A. Mundell.   See especially International Economics op. cit. Chapter 8.   Barter Theory and the Monetary Mechanism of Adjustment.

could be the so-called monetary standard. The target for stabilization policy would then be the rate of growth of the stock of money. Again the argument for controlling the stock of money is not as an end itself but as a superior method of achieving more general economic stability given the incapacity of discretionary stabilisation policy to effectively control prices and output directly.

Another standard that may be selected is what could be described as a debt standard. Here the prime objective of stabilisation policy becomes the stabilisation of the interest rate structure. Usually against upward pressure of the securities market on it. By so doing any 'legitimate' demand for credit would be satisfied at the chosen interest rate structure. An older name for the policy would be the real bills doctrine. In the contemporary world the extra 'legitimate' demands for credit are much more likely to originate with the government sector than the commercial one.

To analyse some of the implications of the alternative standards for prices, interest rates, wages and the exchange rate it is necessary to open the general equilibrium system to trade and finance with the rest of the world. Therefore an extra market, for foreign exchange and an extra variable, the foreign exchange rate i.e. the domestic price of foreign currency needs to be added to the model used previously. The dependent and independent variables of the alternative standards can be summarised as follows. (In addition to the symbols defined previously Π represents the foreign exchange rate and v again represents nominal income or output to allow for the possibility of some price and some quantity flexibility.)

Standard	Target or Independent Variable	Dependent Variables
1. International	Π	r,Y,M,w
2. Commodity	v	r,M,v,Π
3. Full Employment	w	r,Y,M,Π
4. Money	M	r,Y,w,Π
5. Debt	r	r,M,w,Π

If the money supply is taken to be the instrument of stabilisation policy then the money supply function will express the final dependence of the money supply on the chosen target. In other words the reduced form of the money supply function would show the dependence of the money supply on the target variable. In the case of the international standard the money supply will depend on the balance of payments, in the commodity standard on the degree of inflationary or deflationary pressure in the commodity market.

In the full employment standard on the state of the labour market and in the debt standard on the ease or stringency in the credit markets.

As was intimated in the brief discussion of the alternative standards the satisfaction of the standard may not be the prime goal of stabilisation policy. The standard may be only a means to wider but perhaps implicit objectives for economic policy. As it was suggested for the money standard control over the rate of growth of the money stock was considered to be a means of achieving economic stability and so presumably higher rates of growth of real income. Similarly, stable interest rates may be thought necessary for high levels of investment spending and so economic stability.

It may therefore be necessary for the authorities to make the distinction between the final goals of stabilisation policy and the intermediate targets for their policy instruments. The necessity for such distinction follows from relative ignorance about the structure of the system and the effects of the policy instruments within that structure. To quote Thomas R. Saving:

"...(i) if complete knowledge is available, and the goal variables are observable with little or no lag, then the need for a target variable disappears" (29)

In turn, as Saving explains, an effective target variable must be "(1) readily observable with little lag or no lag, (2) rapidly affected by the policy instruments, and (3) related to the goal variables in the sense that policies resulting in the target variable taking on certain values must in turn result in the goal variables taking on certain values". (30)

There is, however, a further difficulty for the authorities. Non-policy induced changes may also influence the target variable. The problem becomes one of separating out the impact of the policy change and the other influences in order to judge the effectiveness of the policy and therefore its future suitability. In addition to the target variable there may then arise the need for a policy indicator that will less ambiguously reflect the expansionary or contractionary impact of policy than the target variable itself. (31)

All the/...

(29)   Thomas R. Saving "Monetary Policy Targets and Indicators" in William E. Gibson and George G. Kaufman (eds. Monetary Economics, Readings on Current Issues', p.419 reprinted from the Journal of Political Economy, Vol. 75, August, 1967, Part II, p.p. 446-465.

(30)   Saving op. cit. p.419.

(31)   See further Saving op. cit. and Karl Brunner and Allan H. Meltzer, "The Meaning of "Monetary Indicators in George Horwich (ed.) Monetary Process and Policy : A Symposium (Homeward Ill. Richard D. Irwin, Inc. 1967) reprinted in Gibson Kaufman (eds.) op. cit.

All the standards are potentially consistent with full equili-
brium in all markets and therefore dynamically stable given time. There
is nothing, however, assuming the stability of the systems, that can be said,
a priori, about the efficiency of the adjustment mechanism in each case,
i.e. the speed with which excess supplies are eliminated in all markets.
The suitability of any choice of standard must depend in part on this
efficiency. The speed of adjustment will depend on the institutions of
the economy. Institutions that may inhibit or enhance the flexibility of
wages prices or interest rates for example. Another factor will be the
capabilities of the monetary and fiscal authorities which also in part will
depend on their knowledge of the structure, and also on the essential
predictability of economic decision making itself. Of great importance will
of course be the sensitivity of interest rate, price and exchange rate
effects of the particular economy in question. These are essentially empirical
issues and may vary from country to country and even from time to time within
any particular economy. It is by way of illustration no doubt true that the
organisation of production and its distribution and the absence of powerful
trade unions made prices and wages generally more flexible in the late nineteenth
century economies than they are at present. The operation of the international
standard then, given the flexibility of prices, would appear to have encouraged
a much more rapid elimination of excess supplies than could be expected of an
international standard today.

The object of the analysis that follows is not to suggest what may be the
'best' standard but to expose the implications of the choice of a monetary standard
with particular reference to/operation of South African monetary policy. To
illustrate that exchange rate stability is not necessarily consistent with price
stability over time and that interest rate stability may be inconsistent with
price wage and exchange rate stability over time. Some familiar implications
of the present-day international system will also be considered.

The first analysis will be of an international standard. To make
the general equilibrium analysis amenable to diagrammatic illustration it is
necessary once again to simplify the model. After the fashion of Patinkin
let it therefore be assumed that the labour market adjusts instantaneously to
excess demand or supply in order to establish the full employment wage rate.
Also it may be assumed that capital is internationally mobile and that develop-
ments on the local securities markets cannot affect the level of interest rates.
Thus, with exchange rates fixed, feedback effects are confined to changes in
the money supply and the price level. Given full employment and the flexi-
bility of wages it may further be assumed that the predominant effects of excess

demand/....

demand or supply are on prices.

The key characteristic of international standard is that any excess demand for foreign exchange (a balance of payments deficit) will decrease the money supply automatically, whereas a balance of payments surplus (excess supplies of foreign exchange) will increase the supply of money. The foreign exchange market can be in equilibrium at a number of combinations of the money supply and the domestic price level. If the money stock is measured on the vertical axis and the domestic price level on the horizontal the FF curve presenting the locus of these potential equilibria will be downward sloping as is illustrated in figure 12.

For balance of payments stability any cet. par. increase in the price level would need to be compensated for by a decrease in the money supply, i.e. an increase in the price level will tend to increase the demand for foreign exchange and a reduction in the supply of money, cet. par. will reduce such demands as preferred money holdings are restored.

Therefore in terms of the requirements of the international standard balance of a payment surplus (left of the FF curve)must increase the money supply and balance of payments deficits, resulting from combinations of money and prices to the right of the FF, will decrease the money supply. The impact on the money supply is indicated by the direction of the arrows in figure (12).

The CC curve again indicates equilibrium in the commodity market. The CC curve will be positively sloped as in figure 13. An increase in the money supply will tend to increase demand whereas an increase in the domestic price level will reduce demands for domestic goods and increase supplies of them. Accordingly to the left of CC inflationary forces prevail and the right deflationary.
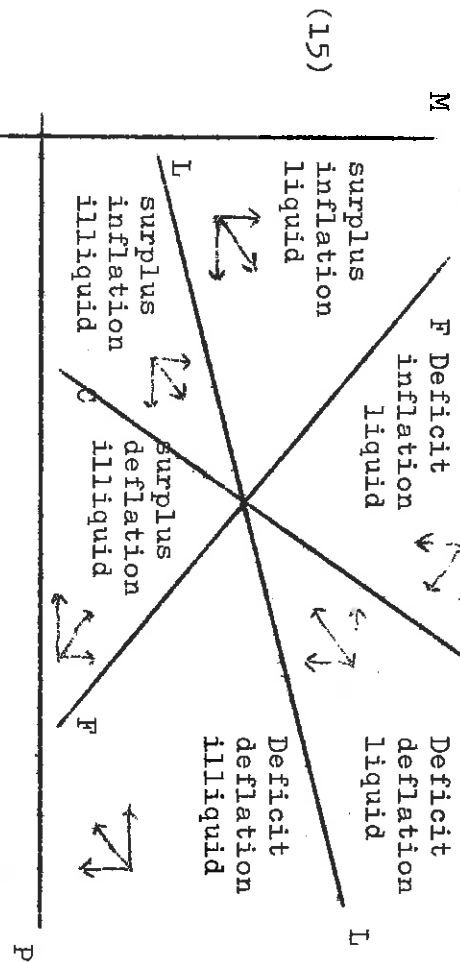
(12)

(13)
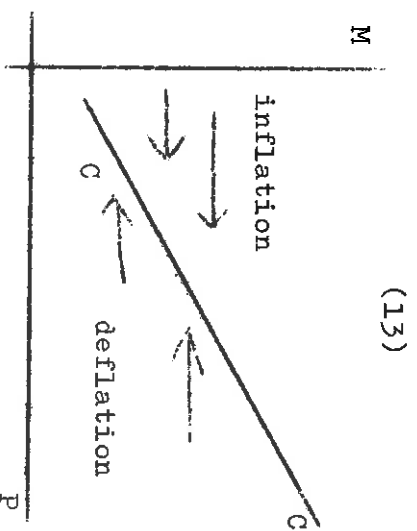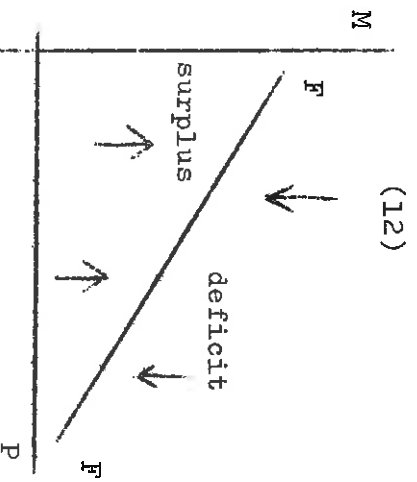
The arrows again indicate the direction of the forces in the commodity market acting on the domestic price level.

Equilibrium in the remaining market, the money market will,
by Walras' law, not be independent of equilibrium in the other markets, of
the system.   The LL curve reflecting equilibrium in the money market will
be positively sloped indicating that an increase in the price level would
result in excess demands for money which could be relieved by a sufficient
increase in the supply of money (see figure 14).

(14)
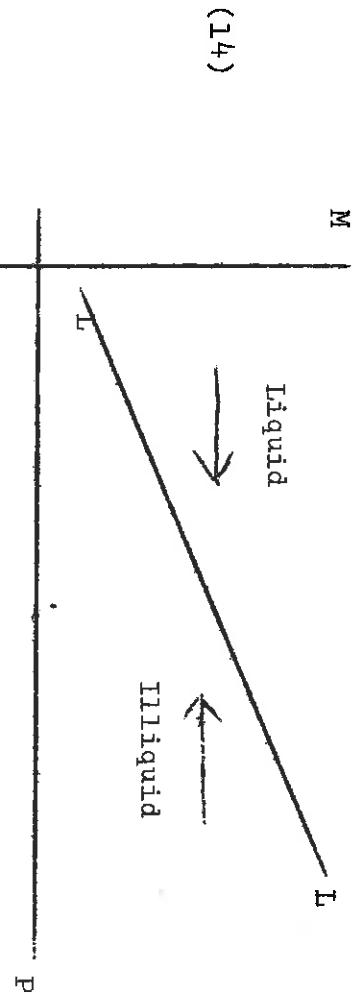
General equilibrium is illustrated by the intersection of the
curves.   The forces on the market are indicated by the direction of the
arrows and, in the assumptions made, would establish equilibrium at e in the
figure.

The LL curve must be flatter than CC otherwise logically impossible
conditions of simultaneous excess supplies or demands in all three markets
could prevail.   The possible economic conditions through which the adjustment
process may take the system are suggested.   Any movement towards equilibrium would
be in the clockwise direction.

(15)

A question of some importance for the international standard are
the effects of an increase in the foreign price level on the domestic economy.
Such an increase would tend to reduce domestic demand for foreign goods and
therefore foreign exchange.   It would also increase foreign demand for domestic
goods and so the supply of foreign exchange.   Thus in the market for foreign

The diagram also indicates what the appropriate directions the
economy and stabilization policy should be taking in the various sectors for
rapid adjustment consistent with fixed exchange rates.

exchange, balance of payments equilibrium could be maintained with a higher level of domestic prices for any given supply of money. In figure 15 the FF curve would shift to the right to reflect conditions of excess supplies of foreign exchange along the original FF curve. The GG curve would also shift to the right as a result of additional demands for domestic goods at any given price level. The new general equilibrium would, therefore, be one where domestic prices are higher but where balance of payments stability at a fixed rate of exchange is still maintained. The analysis therefore shows that balance of payments stability is not necessarily consistent with price level stability. It was confusion on this issue that led to the establishment of the South African Reserve Bank in 1921. During the First World War the commercial banks in South Africa maintained the convertibility of South African money into sterling at the parity of £1 SA = £1 sterling. During the course of the war the South African balance of payments became highly favourable. This was reflected in the growth of the liquid, largely sterling, reserves of the banks. Encouraged by their liquid portfolios and a buoyant demand for funds in South Africa, the banks expanded their domestic lending and so the money supply. This led predictably to a rapid rise in South African prices.

During the war the sterling standard to which South Africa was attached had become separated from the gold standard. Nevertheless, the South African banks were still obliged to maintain the convertibility of their rates into gold coin. The export of gold coin was made illegal and, with the vulnerability of war-time shipping, extremely hazardous. At the conclusion of the war, safe passage and/sterling premium on gold stimulated the export of gold coin from South Africa. The South African banks soon appealed for suspension of gold convertibility requirements. This opened the path to a comprehensive appraisal of the South African banking structure and the appropriate framework under which it should be made to operate. In this manner did the South African Reserve Bank come to be established.

The absence of the discipline of gold convertibility was judged to be responsible for the free lending of the banks and therefore the war-time rise in prices and by their complicity in the inflation the banks were held blameworthy for the very savage post-war deflation. The deflation being taken to follow inevitably from the inflation. That was not widely recognised at the time was that key exchange link had always been with sterling not with gold, and that sterling convertibility was maintained despite the inflation. The South African pound was in part only linked to sterling and gold in June, 1925, and effectively floated against both gold and sterling till then. (32)

(32) See Brian Kantor, "The Evolution of Monetary Policy in South Africa" – The South African Journal of Economics, Vol. 39, No. 1 March, 1971, esp. pp. 46-54.

The implications for monetary policy following the commodity standard will now be considered. The object of the standard is the elimination of deflationary and inflationary pressure in the commodity market. This requires that monetary policy be expansionary in any deflationary phase of the income cycle, and contractionary in the inflationary phases. The standard also requires that the exchange rate be flexible. The exchange rate (the domestic price of foreign currency) would tend to fall with a balance of payments surplus and rise with a deficit.

The interaction mechanism would be described as in figure 16. It will still be assumed that the development in labour and bond markets do not feedback onto the commodity, money and foreign exchange markets of the system. The dependent variables are therefore the money stock and the exchange rate.

The CC commodity market curve is negatively sloped because decrease in the money supply are deflationary and increases in the cost of foreign exchange inflationary. To the left of the CC, deflationary forces prevail demanding an increase in the money supply and inflationary forces to the right of CC require reductions in the money supply.

The balance of trade equilibrium curve FF is positively sloped. Increases in the exchange rate cet. par. lead to surpluses on the balance of payments which could be compensated for by increases in the money supply. When the balances of payments is in surplus to the right of FF foreign exchange becomes cheaper. The domestic price of foreign exchange becomes more expensive when the balance of payments is in deficit. The LL money market curve passes through the intersection of CC and FF and is further confined to being flatter than FF. Reductions in the cost of foreign goods are shown to result in excess demands for money which explains the upward slope of LL.

The model exposes the difficulties of attempting to maintain both price level and exchange rate stability over time. If, for example, relative international competitiveness should alter over time, this would cause cet. par. the CC and FF curves to shift to the left or right. The diagram also reveals that any reluctance to permit the exchange rate to vary in appropriate directions would tend to prolong any state of disequilibrium.

The contemporary international monetary system is characterized by the reluctance of countries to deflate when faced by internal inflation and to upvalue to eliminate balance of payments surpluses. No symmetrical reluctance to inflate or devalue is evident in most countries. The international monetary system has, therefore, appropriately been described as a disequilibrium system.

An analysis/....

An analysis of the debt standard is of particular relevance to South Africa. The primary objective of the standard is the stabilization of interest rates. This indeed has been a primary purpose of monetary policy in South Africa since the early nineteen fifties. (33)

The policy requires that the money supply increases when there would otherwise be excess supplies of government securities and so upward pressure on the interest rate. Any excess demand for securities at the preferred interest rate pattern gives the opportunity to decrease the money supply. However, the policy is not necessarily consistent with exchange rate or price stability over time, as is revealed by the South African experience.

Import controls are direct controls on the demand for foreign exchange and have been maintained continuously since 1947. Exchange controls on the outflow of resident capital were extended in 1956, as an alternative to a further rise in the rate of interest structure in line with developments abroad. Exchange controls have come to be further extended. (34) The exchange and import controls are adopted by the authorities in the light of domestic economic conditions and trends. These measures make the official exchange rate an artificial reflection of the true cost of foreign exchange. / Furthermore the interest rate structure like the rate of exchange has also come to be protected by physical controls on the allocation of funds by financial institutions. Also interest rate controls have been applied to inhibit competition for funds.

A simple debt standard is illustrated in figure 17 with the demand for foreign exchange physically controlled and ignoring once again the interaction system may be confined to the markets for domestic bonds, money and commodities.

Consistent with the behaviour of the debt standard the money supply should increase with excess supplies of bonds at any given interest rate structure and decrease with excess demand for bonds. The price level will increase or decrease with excess demand and supply for commodities. Thus, with money measured on the vertical and the price level on the horizontal, both the BB (security market equilibrium) and CC commodity market curves are positively sloped. Higher prices are associated with excess supplies of bonds which may be relieved at any given interest rate by sufficient increases in the supply of money. Thus, to the

right/...

(33) See Brian Kantor, op. cit. pp. 60-72.

(34) "   "   op. cit. p. 66.