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MONEY AND COMMODITIES

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Introduction

This paper deals with the relation between money and commodities. It is in two parts. Section I, the first part, is a critique; an exposition of some fairly serious difficulties with the ISLM construction. The remaining sections develop an alternative construction which avoids these difficulties. The distinguishing feature of the alternative model is that the level of investment expenditure is directly affected by availability of investment finance and not indirectly via changes in interest rates. A somewhat unexpected comparative static outcome is that a bumper harvest could lead to a decline in productive investment _even_ _when_ there is no change in speculative hoards, nor in interest rates, and banks are carrying plentiful excess reserves. It is also possible to use the model to comment on the controversy surrounding the so-called "Widow's Cruse" property.

The model is an alternative to ISLM in that it relies on a different realised investment function, on a different equilibrating mechanism -- interest rate changes are blocked out deliberately to focus on these,- and on a different time structure for short period equilibrium to guard against pitfalls akin to those identified in Section I. The model also differs from other constructions that attempt to relate money and commodities. In particular, it is sharply at variance with (i) the Quantity Theory linkage, and (ii) The "Real Balance Effect" linkage, made famous by Patinkin.[1]

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[1] Patinkin, 1965

I. Why not ISLM?

In recent years, ISLM has received a lot of bombardment, not the least from Hicks himself.[1] Of several exposed areas, one peristent target has been the manner in which the younger Hicks had constructed the linkage between commodity market equilibrium (IS) and money market equilibrium (LM). Hicks -- and, indeed, Keynes himself-- relied heavily on the rate of interest. Now, both the nature of that link, as well as the exclusive reliance placed on it, are open to misgivings, two of which are:

(a) Does the IS curve possess the same time structure as the LM curve? This may be referred to as the "duration dilemma".

(b) Is it satisfactory to assume that monetary changes and real sector changes cannot interact except via changes in the interest rate? The response to this is grouped under two heads, "only interest?" and "money matters".

I.1 Duration dilemma

The first question relates to the treatment of time and the concept of equilibrium. It is true of course that the IS curve represents a flow equilibrium while the LM curve represents a stock equilibrium. That by itself may or may not be a problem -- see II.3 below. But what is perplexing is the disparity of duration: the future is not equally distant for the two cases. From all accounts it appears that LM represents an instantaneous, temporary equilibrium, whereas IS represents an equilibrium that is static over a short period.

Think of the short period as a year -- say, between January 1, 1986 and December 31, 1986. Suppose that the rate of interest and income-expenditure-output flows are constant over this period. Such a

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[1] See Hicks, 1974, 1977, 1982. For a defence of ISLM, chiefly against the elder Hicks's attacks, see Solow, 1984 .

supposition does not create any immediate problems for IS, but
when we get on to LM, and then to the feedback from LM to IS, com-
plications begin to set in. Compared to January 1, the constant
rate of interest looks very different in terms of the balance sheets
of asset holders when these are reviewed on June 30, and even more
so when reviewed on December 31. For instance towards the end of
the year, there will be this additional experience that the period
over which the current rate of interest has been observed to have
remained stable is now one year more. Except in a longrun stationary
equilibrium or a perfect foresight equilibrium, the lapse of time
would surely make some difference. Particularly so for Keynesian
speculators. These people worry about the absolute level of the
interest rate, but perhaps they worry even more about how soon that
level is likely to change. Among other things, that depends on how
long the level has not changed. So it is necessary to allow for
revision of expectations as one runs the course of the year. That,
however, means that the demand for money shifts over the year. Con-
sequently, the equilibrium rate of interest cannot remain constant,
contradicting our initial supposition.

To avoid this difficulty let us permit the rate of interest to
vary over the year. Then, however, it is IS equilibrium that runs into
problems. The Keynesian marginal efficiency of capital yields a
myopic rule and does not care about the timing of investments.[1] But
surely, if the rate of interest on long term bonds is expected to
fall in the near future, then it would be advisable to postpone some
new ventures even though these are already profitable -- since later
on they will be even more so.[2] Evidently, investors do not expect

[1] Arrow, 1968.

[2] We are assuming that there do exist significant costs of disinvest-
ment in future periods. See Arrow, 1968.

(or suspect) that the rate of interest can change in the short period.[1] But we had just supposed that it does. So the investors have got the time profile of interest rate all wrong and that is another kind of contradiction.

The duration dilemma has been an area of major concern with Hicks.[2] The model of this paper makes a preliminary attempt to get around this difficulty. In the ISLM model, the profitability of long term investment is far too sensitive to speculative moves, because of the fact that investment depends only on the rate of interest and because the rate of interest instantly adjusts to changes in the speculative demand for money. It is as though, on the one hand, the rate of interest behaves like the share price index, while on the other, it behaves like a far away prospective yield. The method of this paper is essentially to devise a way by which investment can remain relatively insensitive to the temporary appearance of instantaneous stock disequilibria, while being very sensitive to the cumulative effects of their persistence. A similar device is already in use -- when explaining commodity market equilibrium as resulting from a stable reaction to unintended investory accumulation.[3] The stocks are adjusted on the way -- temporary stock disequilibria -- but no hysterical effects on planned investments need be acknowledged.

I.2. Only interest?

It would be odd to accept that in general money affects real investment only through changes in the rate of interest. If that were really so then money would cease to matter in an economy in which the

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1/ This raises a problem of consistency of expectations. Why do investors assume that the rate of interest will remain constant while speculators assume that it will not?

2/ E.g., Hicks, 1979

3/ For example, Hicks, 1974, Ch. I

interest rate is policy pegged -- e.g., in India.[1] The trouble,
once more, is with the investment function of the MEC variety. Keynes
considers a competitive capital market in which individual investors
are interest-takers, unconstrained as borrowers at the ruling rate.
What happens if a shortage of funds were to develop in the aggregate?
According to the loanable funds doctrine, there would be a rise in in-
terest costs leading to a decline in profitability of new investments
and thereby to a curtailment of excess demand for additional loans.
But this according to Keynes -- and Kalecki -- is a fallacy for it
ignores the biblical "Widow's Cruse": every investment creates an
equivalent saving (additional supply of loans).[2] So even in the aggre-
gate there is no cause for anxiety. The widow's cruse argument
effectively devastates the loanable funds theory of interest deter-
mination and I shall later spell it out (V.2.1). I do not, however,
feel that it quite establishes the unimportance of monetary factors
(other than through interest charges) for the determination of aggre-
gate investment (V. 2.1) For even though the equality between out-
flow and inflow keeps the size of aggregate investable funds unchanged,
there will now be a larger stock of real assets so the composition of
assets will be different. Consequently, the expost stock equilibrium
will be disturbed at the original rate of interest, and the avail-
ability of funds may directly affect the level of investment at a given
rate of interest. This paper proposes to explore this direct channel
between money and finance on the one hand and real investment on the
other.[3]

The above critique -- of pretending that the rate of interest
is the only bridge between the monetary bank and the real bank -- was

[1] Consider the liquidity trap to see why money ceases to make a
difference.
[2] See the exchanges between Keynes and Robertson, reprinted in
Keynes, 1973.
[3] See Hicks, 1977.

introduced by the remark that otherwise money would not matter.
But why should we insist that for a sensible macroeconomic model,
money must matter?

I.3 Money matters

A simple reason will now be advanced in an attempt to convince
ourselves that money must matter in a monetised economy.

Consider such an economy. Let us do our exercises in two steps,
one over the _very_ short period during which money wages are fixed, and
the other over the _less_ short period during which real wages are res-
tored to some given standard through money wage negotiations. Let
there be a rise in autonomus expenditures. In the very short period
this will raise prices of certain goods -- primarily agricultural
goods -- so real wages will fall.

Move along now to the less short run. This involves an inter-
mediate transition, with money wages rising in an attempt to restore
real wages. If money is an unimportant constraint for autonomus spending, [1]
such expenditures can be maintained in real terms despite the rise
the initial rise in $\angle$ in costs that stems from the wage increase.
But in that case, the money wage rise must lead to a proportionate
rise in all money prices with no effects on equilibrium real demand and
output. [2] It follows that the wage rise will be ineffectual so far as
restoration of real wages is concerned. A wage price spiral sets in,
and money prices cease to function as instruments. If we leave it
at that it means admitting the unreasonable claim that _nobody_ responds
at all to a sustained proportionate rise in money wages and all prices.
If, however, there is something more to be said, then certain things
that in the above argument had been held constant must be allowed to

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_1/._ By autonomus expenditure, I mean expenditures that are independent
of current incomes.

_2/_ This is the reasoning behind Keynes's wage cut argument, Keynes,
1936, leading to the proposition that Hicks has christened "the
Wage Theorem ", Hicks, 1974· The theorem requires excgeneity of
the money wage rate and the real rate of interest, unitary elasti-
city of expectations, and assuming nonautonomus demands to be
homogeneous of degree zero in all money prices and wages.

adjust; we must acknowledge some repurcussions of a sustained
spiral. With a "homogeneity postulate" for consumption demands,
the only possible source of expenditure adjustment must be in in-
vestments. Investments are not financed out of current income flows,
they are financed out of somebody's cash reserves, and it appears
to me obvious that proportionate price spirals affect the real value
of reserves and thereby somebody's real spending.

Money enters the investment function.

II. Structure

II.1 Financial Structure

Let the economy be divided into two consolidated sectors. The
commodities sector (Y - sector) deals with production, trade and con-
sumption of goods and services. The monetary-financial sector
(M - sector) consists of the monetary authority (e.g., Central Banks)
and other financial institutions (e.g., commercial banks). [2]

For an investment to be undertaken, it must of course be pro-
fitable. But profitability is not sufficient. Since the returns shall
materialize later, an investment requires the availability of funds now
in order for it to be executed. Debts arising in the sphere of invest-
ment goods production during the current period have to be settled in

1/ Whether such repurcussions are equilibrating or not is another
matter. The important thing is that there is some response!

2/ The line is drawn at a somewhat different place in Hicks, 1977,
and Bhaduri, 1986. The Hicksian distinction is between a "core"
and a "mantle" (Bhaduri's "periphery") with the Y-sector a part of
the mantle. The core can directly induce a change in high powered
money, the mantle can at best do so indirectly.

money and not carried forward. Accordingly, the funds requirement is a requirement for money. The investable funds may be drawn from either the Y-sector itself, or from the M-sector. Correspondingly, there are these two kinds of funds, the Y-funds and the M-funds.

In terms of this scheme, an investment financed by the issue of shares and debentures and company fixed deposits by firms to households is an investment that draws on Y-funds. Likewise, an investment financed from the firm's own reserves, is an investment that draws on Y-funds. For the purpose of this paper, no distinction will be made between the two.

Borrowing from the Central Bank is drawing on M-funds, and borrowing from commercial banks is also drawing on M-funds. There are two ways of obtaining M-funds for investment, either direct borrowing from the Central bank or direct borrowing from commercial banks.[1]

Definitions

The liabilities of the Central bank[2] will be called cash, H, partly held as reserves, V, by commercial banks (henceforth, banking sector) and partly "kept in circulation" with the "public" (i.e., held by the Y-sector). The latter part will be denoted C.

$$H = C + V \qquad (1.1)$$

The liabilities of the banking sector will be called deposits, D. A part, DC, of these is regarded as virtually equivalent to cash

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[1] Borrowing from public financial institutions set up by the government (e.g., development banks in India) is being integrated with borrowing from the Central bank. In Hicksian terms, such institutions belong to the "core".

[2] We are ignoring net nonmonetary liabilities of the Central Bank, to avoid cluttering up the notation.

and included in money supply with the public. The remaining part
consists of longterm borrowings by the banking sector and is
denoted DT.

$$D = DC + DT \tag{1.2}$$

$$M = C + DC \tag{1.3}$$

Here M represents the quantity of money with the Y-sector, i.e.,
"money supply with the public".

M-sector balance sheets

The economy is a closed one. So the assets of the Central
bank [1] consist of loans to the rest of the M-sector (i.e., to the
banking sector) denoted AM, and loans to the Y-sector (including
government sector) denoted AY. The assets of the banking sector con-
sist of loans, B, to the Y-sector (we are ignoring deposits with the
Central bank) and cash reserves, V.

Central bank: $H = AM + AY$ (1.4)

Commercial banks: $D + AM = B + V$ (1.5)

Y-sector balance sheet

The Y-sector assets consist of course of money, M, but also of
longterm loans to the M-sector, i.e., DT, and real assets, K. Its
liabilities are borrowings from the banking sector, B, from the Central
bank, AY, and a residual term U, introduced for accounting balance.

$$B + AY + U = M + DT + K \tag{1.6}$$

Consolidation

Adding up (4), (5), and (6), and cancelling common terms we get

$$H + D + U = V + M + DT + K$$

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[1] Real assets are wholly imputed to the Y-sector.

And, using definitions (1), (2) and (3), it follows that U measures

national capital:

$$U = K$$

Therefore, we can rewrite (6) also as a financial balance:

$$\begin{aligned} B + AY &= M + DT \\ &= C + D \end{aligned} \tag{1.6}$$

The consolidated accounts of the M-sector read:

$$H + D = AY + B + V \tag{1.7}$$

However, for most of the analysis, we shall need to operate

separately in terms of (4) and (5), chiefly because of the special

powers invested in the central bank in respect of creating H.

A simple chart along Hicksian lines will explain the notation

(Table 1).

Table 1: Balance sheet classification

Sectors	Liabilities	Assets
(A) M sector 1. Central Bank (Core)	Central bank money or high powered money H	(a) Net loans to Commercial Banking Sector AM (b) Net loans to Commodities Sector AY
2. Commercial Banking Sector	(a) Deposits of Commodities sector D (b) Net borrowings from Central Bank AM	(a) Loans to Commodities Sector B (b) Cash reserves V
3. Consolidated M-sector Accounts	H + D + AM	AM + AY + B + V
(B) Y Sector 4. Commodities Sector (Household sector Private Industry and trade Government Sector)	(a) Borrowing from Commercial Banking sector B (b) Borrowings from Central Bank AY Notional liabilities against assets U	(a) Cash C (b) Bank Deposits D (c) Real assets K
Aggregate Economic System	Net liabilities (notional) U	Net assets K

II.2 Time Structure, Stocks and Flows

The short period considered here is just long enough to
permit the income multiplier to work itself out following a distur-
bance. In other words, the saving-investment equilibrium is restored
before we run out of time. Stock equilibrium refers to the financial
balances at the end of this period.

The length of the short period will be treated as constant.
For purposes of stock equilibrium, investment and saving may accordingly
be regarded as cumulated flows over this duration, rather than rates
of flows. For purposes of commodity market equilibrium, however, the
opposite is true. The relevant thing there is quality between the
rate of flow of planned investment and the rate of flow of planned
saving. In this paper the commodity market adjustments are not worked
out in detail , but in dealing with changes, it will be assumed that by
the end of the period these have been equated in a manner such that
transition time unintended inventory changes, arising from temporary
flow rate discrepancies, have been fully corrected for.$\underline{^{1/}}$

In this paper flow equilibrium involves rates per unit time and
does not involve questions of period duration per se^2 . But the notion
of terminal point stock equilibrium does involve the duration; it
involves not so much the within-the-period time curve of instantaneous
flow rates as the area under that curve between the end points.

1/ Eg. lf demand goes up and output adjustments are not instaneous, then
will.be initial unintended inventory decumulation. So when output
does respond it temporarily achieves a higher rate of flow than demand
in order to bring inventories, first to the old, and then to the new
desired stock level. After that the flow rates remain equal. See
Hicks, 1974, for an illuminating discussion on this.

2/ I think this shows the influence of Georgescu-Roegen, 1971; I hope
I have got him right. However, I am quite unable to grasp Hicks's
point that flow equilibrium involves a period; see Hicks, 1979.

I think it will be appropriate to regard saving-investment equilibrium from the perspective of the terminal point financial balance as a _stock-change equilibrium_ and denote the concept as $I = S$. From the perspective of commodity market _flow equilibrium_, saving-investment equilibrium will be denoted $i = s$. For details, please wait till Section IV.

II.3. Mechanism: Two basic assumptions

Interest rates are given and are expected to remain so. This forces a focus on other things and effects an enormous simplification since asset substitution effects and within-the-period interest rate expectations adjustments are immobilised. The money wage rate is historically given for the short period. In Sec VI I do discuss a less short period which incorporates adjustments of money wages to cost of living.

III. Money and Finance: Terminal balance after changes in stocks

III.1. Investment demand

I will, for simplicity, adopt the Keynesian marginal efficiency rule, appropriately corrected for adjustment costs, as yielding the desired level of investment _if there is infinite availability of funds_. Since rates of interest are constant and expectations regarding prospective returns are treated as exogenous to the short period,[1] the MEC/MEI rule yields a unique level of investment. This level, the most profitable but not necessarily feasible level, may be called the "Keynes demand". (This is an echo of the term "Walras demand" used in analysis of non-Walras equilibrium).

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[1] Share price ups and downs permitted, but not endogenised.

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I will assume that there is excess capacity in investment

goods industries leading to a horizontal cost curve, given the

money wage rate. In that case, competitive or semi competitive con-

ditions, leading either to marginal cost pricing or markup pricing,

will imply that P_k , the price of the investment good, is uniquely

determined by w, the money wage rate. Hence, w uniquely determines

the money value of the Keynes demand, $\hat{I}$

$$\hat{I} = I(w) \qquad (3.1)$$

Consider private investment, ignoring government expenditures

to begin with. Then if $\S I$ is the level of aggregate investment, a

part I will be financed by bank loans (M-funded). The remaining

part will draw on Y-funds. I will think of $\S I$ as a demand for

additional bank loans between the beginning and the end of the

stipulated short period, and denote it as β^d :

$$\beta^d = \S I , \quad \text{where} \quad o \le \S \le 1 \qquad (3.2)$$

To avoid needless additional notation, I will assume that the

impact of drawing on Y-funds for meeting the remaining part of aggre-

gate investment results in an equivalent reduction in bank deposits,

D, and in cash reserves, V. of the banking sector. The impact effect

change in M on account of I is denoted $\Delta M (I)$ and the impact

effect change in D on account of I is denoted $\Delta D (I)$.

$$\Delta D (I) = \Delta M (I) = -(1-\S)I \qquad (3.3)$$

III.2 Saving and the availability of funds

An act of saving affects both M and V. First the effect
on M.

Aggregate Saving, S, accrues as additions to financial assets
held by the Y-sector, partly as additional claims on the M - sector,
e.g., additional deposits with the banking sector, partly as addi-
tional claims on the Y-sector, e.g., additional industrial securities

Suppose that a fraction σ of saving over the period accrues
as additions to M. This includes purchase of industrial securities
since that is an addition to Y-funds. Once again assume that the
change in M is fully explained by a change in DC, short term
deposits. Then

$$\Delta DC\ (S) \quad = \quad \Delta M(S) \quad =+\sigma S \quad , \quad o \leqslant \bar{\sigma} \leqslant 1 \quad (3.4)$$

The remainder of S is held as additional long term deposits of the
banking sector, DT.

$$\Delta\ DT\ (S) \quad = \quad + (1 - \bar{\sigma})S \quad (3.5)$$

III.3 Effects on the banking sector

Recall the banking sector's balance sheet (2.5 above)

$$D + AM \quad = \quad B + V$$

For the impact effects of I and S, disregard any induced changes
in AM. The effect of I is two fold. First I creates a demand for
additional loans, β^d.   This, however, may be either smaller or

larger than what banks are willing to offer, β^B. Let β be the magnitude of additional loans **realised** over the period. In the process of investing, the Y-sector will draw this amount from banks, hence there will be an equivalent fall in the banking sector's cash reserves V.

$$\Delta V (\beta) = -\beta \qquad (3.6)$$

Second, because the investment requirements in terms of Y-funds will be drawn from DC, that will reduce V and D. Let I be the amount of realised investment, corresponding to bank financing of β. Then the part that is Y-funded is $(I - \beta)$. So

$$\Delta V (I - \beta) = \Delta D (I - \beta) = -(I - \beta) \qquad (3.7)$$

As against this, the effect of S is to raise D and V equivalently (see (3.4) and (3.5)).

$$\Delta V (S) = \Delta D (S) = +S \qquad (3.8)$$

Hence the net impact effects of I, β and S are

$$\Delta B = + \beta$$
$$\Delta V = \Delta V (\beta) + \Delta V (I - \beta) + \Delta V(S)$$
$$= -I + S$$
$$\Delta D = \Delta DC (I - \beta) + \Delta DC (S) + \Delta DT (S) \qquad (3.9)$$
$$= -(I - \beta) + \sigma S + (1 - \sigma)S$$
$$= -I + S + \beta$$

III.4 Stock change equilibrium

Putting $I = S$ we have

From (3.3) and (3.4), $\quad \Delta M (IS) = \beta - (1 - \sigma)I$

From (3.9), $\quad\quad\quad \Delta D = + \beta$
$$\Delta V = 0$$
$$\Delta B = + \beta$$

The effects are graphically summed up in Table II. The conclusions
are quite important. In particular, (3.10) – (3.13) capture the
essence of the Keynes – Kalecki argument regarding the Widow's Cruse.

Table 2

Effect of Investment on Commercial Banking Sector's Balance Sheet with Stock Change Equilibrium

Causes	Effects					
	Liabilities		Assets			
Stages	Deposits (D)		Cash Reserves (V)		Loans (B)	
	Increase	Decrease	Increase	Decrease	Increase	Decrease
1. Investment (I)						
(a) loans requirement (ρ)	Nil	Nil	Nil	-	$+\beta$	Nil
(b) Y-funds requirement	Nil	$(I-\beta)$	Nil	$(I-\beta)$	Nil	Nil
2. Saving (S)						
(a) in money (DS)	$+\sigma S$	Nil	$+\sigma S$	Nil	Nil	Nil
(b) in other financial assets (DL)	nil	$+(1-\sigma)S$	Nil	$+(1-\sigma)S$	Nil	Nil
3. Net change	$S-I+\beta$		$S-I$		$+\beta$	
4. With I = S	$\Delta D = +\beta$		$\Delta V = 0$		$\Delta B = +\beta$	

Δ Net Liabilities $= \Delta D - \Delta B = 0 = \Delta V$

III. 5 Determination of additional credit

It was earlier suggested that corresponding to a level of investment I, there would be a _demand_ for additional bank credit, β^d, to the tune of §I. Will this be forthcoming? What determines the supply of additional credit, β^s ? Clearly, banks will examine the effect on their _balance sheets_ of granting the loan, since it will obviously be _profitable_ for them to agree to every request for additional credit, as interest rates are fixed.

Consider the balance sheet identity of the banking sector(2.5), and regard (D-B) as the _net liabilities_ of the banking sector vis-a-vis the Y-sector. These are balanced against its assets, V. The striking result, from (3.11) - (3.13), is that no matter how much (or how little) is the extra credit advanced for investments, the effect on the banking sector is always to leave both its net indebtedness to the Y-sector as also its cash resources _exactly_ _unchanged._

Proposition 1.   In _stock-change equilibrium_, the level of the banking sector's cash reserves (V) and the level of its net liabilities (D - B) are independent of the magnitude of additional investment credit over the period.

It is important to note that the proposition is independent of the value of σ -- ie, how much of the saving generated is held as money and how much is held in long term securities. Also note that no reference is made to a market clearing condition $\beta = \beta^d = \beta^s$

I will assume that the banking sector decides on β^s, keeping Proposition 1 in mind. However the crucial point to bear in mind is that the information content of this proposition is too limited

for the purpose of determining β^s. It is not merely the aggregate
levels of assets and liabilities that matter; their composition
is crucial. At the least, banks will refer to (3.11) - (3.13).

One of the important variables for banks in a fractional
reserve system is the ratio between cash reserves, V, and total depo-
sits, D, henceforth called the reserve ratio. It will be assumed, for
the present, that banks are keen to extend as much credit as possible
subject to a minimum reserve ratio to be denoted λ_0. (We do not
ask how λ_0 is fixed, but it may well correspond to a statutory requ-
irement for adequate backing up of deposit money). This immediately
provides for a very simple theory of determination of β^s and β

III.5.1 Feasible supply of credit

In this section we consider the case where it is not possible
for banks to augment V by additional borrowing from the core -- either
from the Central bank or from refinance institutions.[1] Thus we are
sticking to the assumption already made that additional credit is not
accompanied by induced changes in AM (see 2.5)). In that case, as
already shown, the reserve ratio will fall from an initial value
(V_0/D_0) to a terminal value $[V_0/(D_0 + \beta)]$.

Let $\bar{D}(V) = V/\lambda_0$ represent the maximum deposits supportable
by V, given λ_0 Then $(\bar{D}(V)-D)$ stands for some kind of an excess

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1/ Otherwise it would, in effect, be borrowing from the core
by the Y-sector. This is discussed in V.3 below

capacity for banks, a ~~deposit~~ ~~shortfall~~, d. At the ruling interest rate, our hypothesis is that $\ell^B = d$ [1]. Equivalently we might define excess reserves $e (V, D)$ as $[V - \underline{v} (D)]$, where $\underline{v} (D) = \lambda_0 D$ represents the ~~minimum~~ reserves required to back up D. However, since in our scheme a loan does not affect V, but affects D, it is not e as such but d (i.e., e / λ_0) that acts as a ceiling.

Since the rate of interest cannot ration credit, we need an alternative device. Let us postulate

$$\beta = \min [\beta^d \; \ell^B] \tag{3.14}$$

as the rule for fixing the level of realised additional credit, Noting that

$$\beta^B = d (V_0, D_0), \text{ where } \underline{d}(V, D) = D (V) - D$$
$$\text{and } D (V) = V / \lambda_0 \tag{3.15}$$

we have

$$\beta = \min [\beta^d, d(V_0, D_0)] \tag{3.16}$$

Equivalently, in (3.16) above, we could have replaced $d (V_0, D_0)$ by $(e(V_0, D_c) / \lambda_0)$, noting that

$$e (V, D) = V - \underline{v} (D), \text{ where } \underline{v} (D) = \lambda_0 D \tag{3.17}$$

For brevity we shall write d_0 for $d (V_0, D_0)$ and e_0 for $e(V_0, D_0)$.

3.5.2 The effective demand for credit

Let us now turn to the demand for additional credit. The "effective demand" [2] for credit will recognise constraints on investment ~~other~~ than the difficulties of obtaining credit. In terms of what went

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[1] If $d < 0$ were possible, then β^B would represent a demand for "loans" ~~from~~ banks — say, by announcing attractive fixed deposit schemes. However since $V \geq \lambda_0 D$, we can only have $d \geq 0$.

[2] In the sense of nonWalras equilibrium theory, e.g., Malinvaud, 1977.

earlier (Sec III.1 above), apart from bank credit, the influences

on investment are (a) profitability - leading to the Keynes demand,

$\hat{I}$, and (b) availability of Y-funds for investment purposes. Suppose

that $\hat{I}$ is the maximum investment consistent with availability of

Y - funds. Then for the purposes of β^d , the relevant variable will

be taken as min ($\hat{I}, \hat{I}$). Thus

$$\beta^d = \S \min (\hat{I}, \hat{I}) = \S \overset{N}{I} \tag{3.18}$$

It is then immediate that investment will be credit constrained

if $\overset{N}{I} > d_0 / \S$. Thus if I is realised investment in stock

change equilibrium, then we must have

$$I \leq d_0 / \S \tag{3.19}$$

3.6 Money demand

We have yet to specify β^d completely because we have not speci-

fied $\bar{I}$. For this we have to look at the Y-funds constraint. There

are two aspects. Firstly, the effect of investment on availability

of M. Secondly, the effect of investment on the requirements of M.

It has already been shown that if β is the extent of additional bank

credit, then the net change in availability of M is $[\beta - (1 - \sigma)I]$

(see (3.10)). What about money demand?

We shall think of the two conventional sources of money demand.

The demand for money in nominal terms is made up of a transactions

requirement and a reserves requirement. The latter serves precaution-

ary needs and also provides liquidity to take advantage of new invest-

ment opportunities in the near future. Let us write

$$M^d = k (Y) + R \tag{3.20}$$

where k is increasing in Y and R is exogenous given expectations

regarding future prices. We shall mention how R might be affected

by changes in I or w, but begin by holding it constant. Then if

Y is the terminal rate of aggregate commodities output in money terms,

we require at the terminal point the following inequality for Y-funds

balance $\underline{1/}$:

$$M_1 \geq k (Y) + R \qquad (3.21)$$

But $M_1 = M_0 + \Delta M$ (IS)   Hence from (3.10) we have

$$M_c - k (Y) - R \geq (1- \sigma)I - \beta$$

$$\text{or} \quad I \geq \frac{M_0 + \beta - k(Y) - R}{(1 - \sigma)} \qquad (3.22)$$

The R.H.S. of (3.22) is what had been denoted $\bar{I}$.

$$\bar{I} = (M_0 + \beta - k(Y) - R) / (1-\sigma)$$

It is being assumed that $(1- \sigma) > o$. Denote the R.H.S. of (3.23) as

a function $A (\beta, Y)$, treating the remaining terms as "knowns". The

nature of the function will depend on how β is determined.

Recalling (3.16) and (3.18) we have

$$\beta = \min \ [d_0, \ \S \min \ (\hat{I}, \ \bar{I}) \ ] \qquad (3.24)$$

So there are three cases to be considered.

(i) $\underline{\beta = \S \bar{I}}$.   In this case we have $\bar{I} = (M_0 - k(Y) - R)/(1 - \sigma - \S)$.

Denote the R.H.S. as $A_1(Y)$, which is clearly independent of d_0 or $\hat{I}$.

(ii) $\underline{\beta = \S \hat{I}}$. Then substitute for β in (3.23) and denote the R.H.S. as

$A_2 (Y)$ treating $\hat{I}$ as given.   In this case $\bar{I} \leq A_1(Y)$;

i.e., $A_2(Y) \leq A_1(Y)$ for this to be possible.

(iii) $\beta = d_0$.   Then substitute for β in (3.23) and denote R.H.S. as

$A_3(Y)$ treating d_0 as given.   For this case to arise Y must

be such that $A_3(Y) \leq \min (A_1(Y), A_2(Y))$

$\underline{1/}$ The focus on terminal balancing rather than intermediate balancing
is to avoid duration disparity explained in Sec I. Of course this
assumes that temporary, within-the-period imbalances are considered
entirely tolerable.

We can now impose the following rule to determine the level

of realised investment, I:

$$I = \min [d_0 / \S , \hat{I} , \Phi (Y)] \qquad (3.25)$$

where $\quad \Phi (Y) \quad = \min_{Y} (A_1 (Y), A_2 (Y), A_3 (Y))$

Clearly, $\phi (Y) = A (\beta ,Y)$ for β satisfying (3.24). I shall say

that $I = \phi(Y)$ represents the Y-funds constraint, for given

values of d_0 , (M_0-R), $\S$ and σ . Following Keynes, we can call

$m = (M - R)$ the "active demand for cash" comprising transactions

requirement and requirements for current investment (Keynes' "finance").[1]

Given the somewhat drastic level of simplification adopted

here, it is not surprising that $\phi(Y)$ has a particularly easy form.

We can draw a picture (Fig. 1), assuming that $k(Y)$ is linear[2].

Then each $A_i(Y)$ is linear as well. Assuming $\phi + \S < 1$, we get three

downward sloping straight lines, and taking the inner envelope yields

kinked piece-wise linear graph depicting $\phi(Y)$. The kink arised

because the diagram has been drawn on the assumption that

$$q = \min (d_0, \S \hat{I}) < \S \ m_0/(1 - \sigma - \S)$$
$$m_0 = (M_0 - R) \qquad\qquad (3.27)$$

It is evident that the intersection between $A_1(Y)$ and

$\min (A_2(Y), A_3 (Y))$ yields a value of Y, say 'a' , that is necessarily

larger given $\sigma + \S < 1$, than that yielded by the intersection

---

1/ Keynes, 1938. Reprinted in Keynes, 1973.

2/ This is often treated as an implication of the lack of money
illusion. But lack of money illusion cannot be sufficient for
linearity since k is an average over different segments and the
weights may well change with changes in Y.

between c and $A_1(Y)$ -- say 'b'. Thus the rule (3.25), depicting

the relation between I and Y for M-equilibrium, yields an __MM__ __curve__

that has a single kink at $Y = b$. For $Y \in (c, \ )$ the __MM__ __curve__ is

flat. If overall equilibrium falls in the interior of this range,

then the Y-funds constraint on I will not be binding and for small

changes, I will be __independent__ __of__ __Y.__ In this range, the simple

hypothesis that __investment__ __is__ __autonomous__ holds good even after

considering monetary repurcussions. Here, I is determined either by

low levels of net profitability or by low levels of excess reserves,

with neoKeynesians voting for the first.

Easily the most interesting case is the downward sloping

stretch for large Y, i.e., $Y > b$. I feel this stretch to be the

important conclusion to emerge from the present construction. For

here increases in current level of output are obtained only at the

cost of a lower level of investment. One is ofcourse sufficiently

bored with the standard cliche of a trade-off between current out-

put and future output, but in the present case the __reasons__ __are__ strik -

inglydissimilar to the familiar. The inverse relationship between

I and Y does __not__ result from a choice of technique type explana-

tion (as in Sen, 1968), __nor__ from any resource constraint on aggre-

gate output (as in say, Ramsey, 1928). Indeed, we have not even come

to the commodity market, to income redistribution, or real resource

constraints. In the present set-up, the inverse relation reflects the

competing nature of claims on available funds, the contenders being

transactions requirements to circulate current output and financial

requirements to execute current investments. This feature surely

survives generalisations that complicate the construction. The

__specific__ nature of the simple-minded construction is merely expository
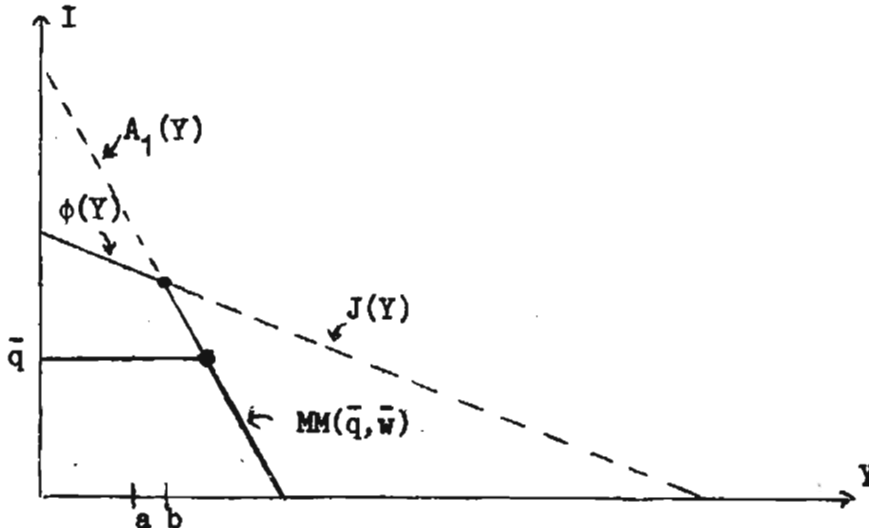
and relatively unimportant.

We can alegebraically sum up the M-equilibrium relation, suppressing the given q:

$$I \quad = \quad I\ (\dot{Y})$$

where $\quad I(Y) \quad = \quad \min_{Y} \ (q, \ \phi(Y)\ )$

Graphically $I(Y)$ is called the MM curve, denoted MM $(\tilde{q}\ , \ \bar{w}\ )$.

Note: $J\cdot(Y) \quad = \quad \min_{Y}\ (A_2\ (Y),\ A_3\ (Y))$

Fig 1   Monetary equilibrium

IV. Closure: Commodities balance

The other side of the saving-investment equality relates to the equilibration of the two flow rates as a result of commodity market balance (Y - equilibrium). This is such a familiar relationship that I can be very brief. It yields a comparative static relationship between I and Y, with I as the independent and Y the dependent variable. A very large class of models will yield such a relationship -- from the aggregative monoclass simple multiplier story to Kalecki's two-class, three department theory of profits and further on to other dissaggregated models with numerous special structural features

(e.g., fixprice and flexprice rules), etc.

For the present purpose, and with an eye to illustrative comparative static exercises that can illuminate the nature of the linkage between the M and Y sectors, I will take, as given the short period property that, with money wages exogenous, there are two key parameters (from the point of view of the Y-sector) which determine the instantaneous rates of flow of real outputs and the instaneous levels of aggregate employment and commodity prices, measured at the terminal point of the given period (t_0, t_1).

These are (i) investment expenditures, I, and (ii) autonomous output-- i.e., pure flexprice output, say, agricultural output -- Q. The following comparative results are relevant (see Rose, 1985; Kalecki, 1976):

T1. Given Q and w, an increase in I raises the rate of aggregate profits, π , aggregate employment, L, the price of autonomous output, p, and thereby also the rate of aggregate money income, Y.

T2. π is determined only by I; in particular, π is independent of distributive parameters, prices and Q [1],

T3. Given I and w, an increase in Q raises L and reduces p.

T4. Given (I/w) and Q, L and (w/p) are independent of w [2].

---

[1] This assumes that profit earners constitute a homogeneous group. I am also assuming that autonomous expenditures other than I are held constant, measured in wage units.

[2] This is a Keynesian Theorem, christened the "Wage Theorem" by Hicks, 1974. It assumes a homogeneity postulate for non autonomus expenditures.

In deference to an earlier promise, I must spell out the interpretation of the different key variables in respect of the <u>time structure</u> assumed in this paper.

We have a given interval $(t_0 \quad t_1)$ for our short period. Let the function $i(s)$ represent the rate of flow of money investment at an instant $s \in (t_0, t_1)$. Then $I = \int_{t_0}^{t_1} i(s)\,ds$. A "change in investment" corresponds to a new function, say $\bar{i}(s)$, and a new I. For simplicity, assume that $i(s)$ is chosen from an exogenously given family of <u>constant</u> functions. Thus in each case we have $i(s) = i$ for some i. Call this <u>period - stationarity</u>. So, for each period-stationary-i, there is a unique exogenously determined I, and a unique terminal-point-Y, i.e., $Y(t_1)$. The initial point always refers to the initiation point for any change from the previous period. The initial Y of this period is always the terminal Y of the last period since the adjustment to a change is not instantaneous (no discrete "jumps"). But if there is no change in i at t_0, then period stationarity of i will imply period stationarity of Y as well. The absence of initial point change in i will be called <u>maintained stationarity</u>. The introduction of a new function $i(s)$ at t_0 will be called a <u>disturbance</u>. Following a disturbance, there will be an <u>adjustment period</u> over which period stationarity for Y and other endogenous variables will be disturbed. However, the adjustment is completed before we cross t ; there is $\varepsilon > 0$ such that for

$s \in (t_1 - \varepsilon, t_1)$, $Y(s) = Y(t_1)$ where $Y(t_1)$ represents the new equilibrium rate for Y. So also for L, p, etc. With this at the back of our minds, we suppress t_1 and interpret Y, L, p as terminal point equilibrium values.

Again for simplicity, I assume away seasonalities in Q, and
assume that Q represents a period-stationary exogenous flow rate on
a par with i.

It follows that for each I, given Q and w, there exists a unique
Y. From T.1 it is clear that $Y = \pi + wL$ is positively associated
with I. This comparative static property will be denoted

$$Y = Y(I) \qquad (4.1)$$

So, it is now easy to describe _overall_ equilibrium.

Short period Macroeconomic Equilibrium

$$\left. \begin{array}{l} I = I(Y) \\ Y = Y(I) \end{array} \right\}' \qquad (4.2)$$

The picture for this is Fig. 2. The relation $Y(I)$ generates the
Y-equilibrium curve YY for given Q and w denoted $YY(\bar{Q}, \bar{w})$.
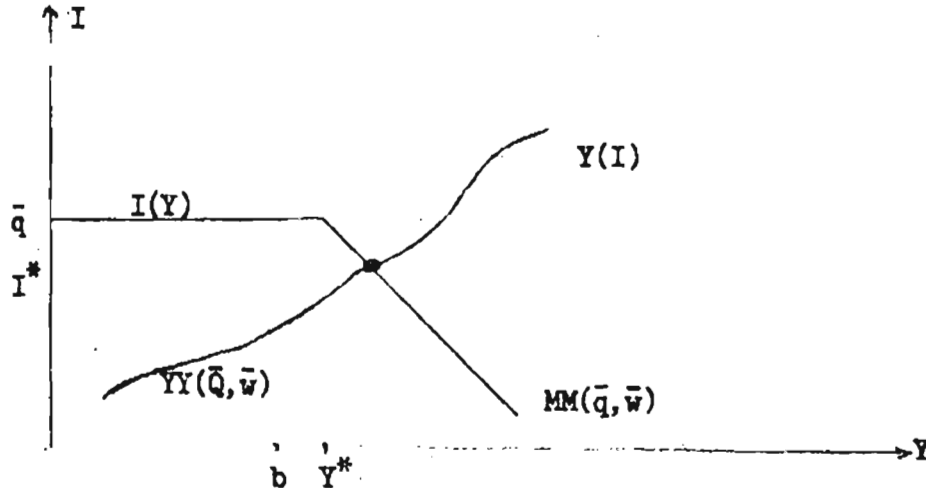
Fig 2. _Short period macroeconomic equilibrium_

V Comparative Statics

V.1. _Effects of a better harvest: the paradox of thrift?_

The YY curve is really the saving function of the "Keynesian
cross", since it/the locus of commodity market saving-investment

equilibr⁖ im for arbitrary varia⸱ᴏns ᴏf autᴏnomoᴄs investment. In
the present set up, with a higher mps for ⸱rofit eᴠrners, the curve
is clearly distribution sensitive. A lowering of the price level
redistributes in favour of low savers since money wages are fixed.
Thus a rise in agricultural output by lowering prices reduces the
average saving – income ratio for the economy and YY shifts down
(i.e., to the right).

This· can be seen directly from T2 and T3. Given I and w, a
rise in Q raises L and leaves π unchanged. Now $Y = \pi + wL$. So
for the same I, a rise in Q, from Q_0 to Q_1 , say, shifts the
YY curve to the right.

Since Q does not have any independent role to play in the
determination of M – equilibrium, the autonomous rise in Q leaves
MM unaffected.

The effect on Y is clearly positive. But what of the effect
on I? That depends on where the initial equilibrium, took place. If
$Y_0 < b$, then for a "small change" in Q, there is no effect on I
and S. This is equivalent to the effect of everybody deciding to be
more thrifty: there is no effect on aggregate saving and investment.
This is (a weak form of) the Keynesian "paradox of thrift".

I think the far more interesting case arises for $Y_0 \geq b$.
Then a rise in autonomous output actually <u>dampens</u> aggregate invest-
ment. This brings out the essential nature of linkage explored in
this paper: If investment is Y-funds-constrained, then autonomous
increases in real output causes more money to be "locked up" in
current transactions, leaving less available for investment finance ;
so. some new ventures are postponed and aggregate investments

curtailc.. I doubt that this explanation·has nothing to do with
the Indian experience of the rate of growth not picking up despite
some "good years" in the late sixties and the seventies.[1] I am
sorry I cannot go into the lessons to be drawn, particularly in res-
pect of arrangements for short term credit to finance working capital
requirements.[2]

V.2. Change in profitability

We shall deal with two kinds of changes in respect of. I. The
distinction is not between private investment and public investment
as such. The distinction is between that part of the change in in-
vestment that does not induce -- either directly (by changing ΔY)
or via banks and other intermediaries (changing ΔM) -- a change in
high powered money H, and that part that does. The first part will
be denoted IP, the second part IG. Obviously this is only an analy-
tical division and not an empirical one.[3] First consider the case
where the change is entirely an IP-type.

Clearly the importance of this case arises only if
$\hat{I}_0 \leq$ min ($\dot{d}_0$, $\phi(Y)$); else I will be independent of $\hat{I}$. So
suppose that $\S \hat{I}_0 = q_0 < d_0$ and $Y_0 < b$. Then for small changes
we have a thoroughly Keynesian case, indeed of the liquidity trap type,
where the income multiplies effect explains all induced changes. But
for a large enough change one of the previously inactive constraints
may become operative. For instance, if $\S \hat{I}_1 > d_0$ but $Y_1 \leq b$ holds,
then the desired increase in I fails to fully materialise because

[1] C.f., the complaints of Chakravarty, 1977.
[2] for which, see Rakshit, 1982, Chs. 5, 8, 9.
[3] See Patnaik, 1986, where it is argued that in the Indian context, changes in private investment do induce a change in H.

a credit constraint becomes applicable and there is some crowding out.

This last posibility is relevant for an evaluation of the "Widow's Cruse" debate.

V.2.1 The Widow's Cruse: Investment Finances itself (?)

The Keynesian reference to the Biblical parable of the "widow's cruse", is in substance the same as the Kaleckian dictum "investment finances itself"[1]. This was employed by these authors to demolish the loanable funds doctrine that the rate of interest is determined by the equilibrium between the demand for and the supply of additional credit. In terms of the present discussion, the fallacy can be seen very easily by referring to Proposition 1 above in III.5, and the discussion following it. The problem with the original loanable funds doctrine is actually this: in the absence of direct reference to the underlying stock situation for banks (i.e., $\dot{}_0$) it is not possible, thanks to Proposition 1, to define β^s : the unconstrained, "Walras supply", say $\hat{\beta}^s$; is indeterminate. In such a model, β^s would simply be defined along the β^d curve drawn against the rate of interest so there is no closure!

So the original loanable funds doctrine is invalid. However that does not mean that investment/always is capable of financing itself --we have just given an example of that in terms of a credit constraint! Equally there might be a money constraint (i.e., a Y-funds constraint). So the Kalecki statement is also false. The mistake lies in thinking about credit only in terms of $\hat{\beta}^s$; that is indeterminate, but clearly the effective supply, β^s, is not so![2]

[1] See Keynes, 1937, 1938; Kalecki, 1971, p.84.

[2] I ought to point out that Kalecki was treating the investment change as being entirely of the IP-type (Kalecki, 1971, p.84).

V.2.2. Trend or Fluctuation

We have been rather vague about the nature of "change". Is it part of a fully-provided-for time trend[1], or is it a fluctuation not wholly-provided-for? I have already given myself away by having referred to the initiation of change as a "disturbance" (see IV above).

Why is it important? Consider the Y-funds constraint. If the rise in investments from period to period is part of a long run equilibrium then it will be associated with a corresponding, prior rise in R that will accommodate the required rise in "active balances" (as defined in the paragraph between((3.26) and (3.27)) so things will be just right and, with a little bit of luck, the "Keynes demand" can go "roaring ahead", as the saying goes[2]. But here we are concerned with a short-period analysis that focusses on disturbances from a given trend. That is why the initial stocks have a historical status.

V.3 Induced changes in Central Bank borrowings: IG - type changes

Assume that there is an increase in investment wholly financed by an equivalent rise in ΔY at constant ΔM. So there is, over the period, an equivalent extra addition to H. In the first place this expands C and D, so in the first round there is an equivalent extra rise in M. But then as D has swollen up, V does so too by the same amount, hence (V/D) rises, being a fraction. T' is generates excess reserves, and stimulates β^s. If, initially β^d had been credit constrained, i.e. $\beta < \beta^d$, then now β will rise and so investments

---

[1] Is there such a thing? Rational expectations equilibrium? Perfect foresight equilibrium? Longrun equilibrium?

[2] The saying is from Hicks' review of the General Theory, see Hicks, 1936 (reprinted in Hicks, 1982).

of the IP - type will rise by a multiple f that. The multiplier

on β is greater than unity since the extra H will also relax any

Y-funds constraint on I. Thus <u>deficit financed investment expendi-

tures</u> create a <u>multiplier impact</u> on aggregate investment (total of

both types). We can write

$$\Delta I \;=\; \Delta IG + \Delta IP \;=\; (1 + \psi)\; \Delta IG \quad \text{for some} \quad \psi > 0 \quad (5.1)$$

V.4. Investment and the sale of government securities

Assume that we are dealing with an IP - type change.[1] So there

is no change in H. Then, when the government sells securities, the

public purchases these by running down D. Thus initially D and V

go down by the amount of additional IP. However, as the government

spends the amounts collected this generates, in stock-change equili-

brium, equivalent additional saving.   Hence D and V go back

to where they had been and there is no change in the banking sector's

balance sheet. So the effect falls entirely on the Y-sector. It is

simply the case where $\S = 0$! Since DC is unchanged, and H is

unchanged, there is no effect on M. The issue of marketable debt by

the government may or may not create a distributive wealth effect

(after recognising the discounting by government and the private sector

of curtailed spending and future tax liabilities on account of debt

financing), but we do not go into this here. Treating government

expenditures as wholly autonomous, there will however be an extra

pressure on Y-funds availability. So if I becomes Y-funds - constrained

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[1] It has been recently argued by Patnaik (Patnaik, 1986) that market
borrowing induces a rise in H. The claim is not being contested
here. If it does then it is in effect a direct borrowing from the
Central bank and included as an IG-type investment. We do not here
go into the interesting question of whether "deficit financing"
should include marketable debt or not since we have not developed
a theory by which we can explain the reasons why a change is IP-
type or IG-type.

I think the justification lies in the delinking of the
short period from the less short period. In the short period, ex-
pectations adjustments are not given effect; nor are money wage
changes consequent to cost of living variations acknowledged. That,
indeed, would be the main adjustments for the _less_ short run: the
importance of "conventional wage" requirements fixed in real terms,
and the importance of Y-funds in _real_ _terms_ relative to real money
demand. (The reserve ratios, etc., are of course independent of
price changes). Moreover, for the less short period, the effect of
government control (or inability to exercise it) can be considered
more substantively after bringing in _inflation-concern_, such concern
partly reflecting the upsetting consequences on real variables over
the short period of unprovided-for-rises in costs and prices. The
irreducible regidities in instrumental monetary variables (e.g., money
wages, prior budgetary provisions for expenditure on capital accounts
etc.) is what makes the short period a nondegenerate, non-uninteresting,
interval of time.

The short period is a device by which the importance of time
as a constraint on economic adjustments is incorporated. The non-
availability of extra time prevents desired adjustments from being com-
pleted. This paper has investigated an aspect of this general problem.

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