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A THEORETICAL BASIS FOR FINANCIAL PROJECTIONS

Note Economic Development Research Papers are written as a basis for discussion in the Makerere Economic Research Seminar. They are not publications and are subject to revision.

The intention in this paper is to clarify the theoretical basis for a study of financial prospects in East Africa with particular reference to Uganda and the Uganda plan. No attempt will be made here to give any conclusions, however tentative, nor to draw upon any of the statistical analysis that has already been done and which will form part of the finished product; in this paper I want to concentrate on the tools and on the model for the study. I have therefore divided the paper into three parts: the first part dealing with the objectives of the research and the content of the study; the second part setting out certain basic propositions which will be used in the analysis and the third part dealing with the model itself.

Part I

The object of the research is to make projections of the finance available, in particular for Uganda, over the period of the Second Five-year Plan and for Kenya and Tanzania in less detail over the same period, the latter largely for the purpose of assessing the probability of harmony in fiscal and monetary policy. It may be argued that this exercise has already been completed in the three national plans and it is true that, to the extent that the assumptions and propositions in those plans are tenable the dimensions of the financial requirements for the achievement of the growth targets are determined, but this is not the same thing as specifying a financial plan. When one examines the plans closely it is immediately clear that most of the necessary ingredients for financial planning are missing. I shall use the Uganda Plan to illustrate this Table I reproduces plan table 14 entitled 'Financing Development Spending' and it contains the aggregates upon which the whole financial structure of the plan is based.

TABLE I

(PLAN TABLE 14)

Financing Development Spending

£ million

	Foreign	Local	Total
1. Central Government			
(a) Taxation	-	30	30
(b) Borrowing (including foreign grants)	50	10	60
2. Parastatal	20	40	60
3. Private	15	75	90
Total	85	155	240

There is some ambiguity as to whether this table is a source of funds or use of funds table, the columns are certainly classified as to source whereas the rows are presumebly classified as to user. The implication of this is the para-statal bodies will themselves raise all of the sixty millions they are scheduled to spend and, likewise, that the private sector will raise all of the ninety millions that it is scheduled to spend; only in the case of Central Government is there to be any transfer between sectors and we have no information whatever about the source of the local funds which it is planned shall be brrowed by the Central Government (ten millions), by the parastatal bodies (forty millions) and by the private sector, (seventy-five millions).

Moreover, when we go on to examine the text of Chapter Two dealing with this table, it is only too clear that none of these figures is supported on an empirical basis. Let us look in turn at each of the headings under which the sources of finance are dealt with in the text; these are:-

(i) private savings
(ii) budgetary surpluses
(iii) social insurance schemes
(iv) monetary expansion
(v) foreign aid
(vi) foreign private capital

(i) Private savings. Paragraph 2.49 under this heading reads "over the years for which records are available, private savings have made an impressive contribution to Ugandan development. Direct records of savings as such are not available, but there has been substantial investment over the years in the private sector in which net foreign investment has by and large played but a small role. Indeed, it is likely that in some recent years private savings have been in excess of local private investment, substantial funds being exported."

Anyone who has looked at the magnitude and variations in the errors and omissions figures in the balance of payments estimate will be very chary of accepting estimates of private domestic savings based on the difference between the figure for gross capital formation and that for net external finance. The order of magnitude of probable error in any figure obtained thus, by difference, is likely to be very large. Reliance upon such crude estimates is not the fault of the planners, but a necessary procedure in the absence of any direct estimates of private savings whatever. It is hoped that some contribution may be made to rectify this deficiency by the study which Mr Hubner is just starting,[1] which is a first attempt to make some kind of estimate of the order of magnitude of savings in the private sector in Uganda classified by source and by asset acquired. This study will be based mainly on four sources: 1) figures which are now being extracted from the data obtained in a large-scale sample survey of Buganda coffee farmers. 2) a questionnaire to all civil servants and to salaried staff of a sample of large organisations. 3) income tax data, and 4) the results of the analysis of the "Cooper" Card Index[2] data which is now being undertaken by Mr Gervers. I hope very much that some provisional results at least of this research will be available for the present study.

(ii) Budgetary Surpluses. There no evidence given that there has been any systematic analysis of the built-in growth factors in expenditure or of the income elasticity of existing taxes or of the scope for the imposition of new taxes. It is proposed to do as

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1. Economics Research List, Ec.30.
2. Economics Research List, Ec.22.

much as possible in "the way of giving some content to the possible Orders of magnitude of this item but my immediate reaction is that the target of £30 million of public savings via taxation during the plan period is a gross over-estimate.

(iii) Social Insurance Scheines. The only reason for singling out social insurance scheines would seem to be that here, in fact, it is possible to calculate a fairly firm figure, yet strangely no such figure is given in the plan. An attempt will be made to estimate the magnitude of all such institutionalised savings.

(iv) Mcnetary Expansion. This I belive to be the most ambiguous item of all in spite of the fact that what is said is very sensible. Paragraph 2.70 reads "from the outset of the second plan, Uganda will have her own central bank, and fiduciary finance should become a regulär feature both of countercyclical fiscal policy and of Provision of longer term development finance. However, there is a very real constraint on such finance caused by the need to maintain sufficient external reserves". The following paragraph goes on to say "Uganda will begin its second plan in a less liquid state than it has enjoyed in the past. As a definite policy, the Government has drawn down reserves in recent years to finance development. Also, the commercial banking s.ystem is now fully extended. In the early years of the plan, therefore, monetary expansion will be used only to a very limited extent". The argument is understated and the conclusion raises a number of important questions which do not seem to have been considered. One of the ma.ior objectives of the present study will be to analyse in detail the scope and limits for credit creation. It will be necessary to consider the contrast between Governments[1] past borrowing from the Currency Board, which has enabled the Uganda Government to obtain £10 millions for development since 1955 a period in which East African currency did not expand at all, and the creation of bank credit from which the East African Governments received nothing (net) in spite of an increase of fifty millions in the credit extended to the private sector over the same period. Moreover not all credit creation takes the form of monetary expansion and the distinction is important if constraints on the latter are present. It is proposed to clarify the relationship between credit creation and the balance of payments not only because of the prospects of financing Government development expenditure by borrowing from the monetary authority but because an ana^sis is necessary of the extent to which credit and money must be expanded in order to carry out the plan at all. In particular the implications of a fully extended banking system plua a plan which aims at a balanced external account must be investigated.

(v) Foreign Aid. The estimate given for foreign aid of £50 million is described in the plan as optimistic. Paragraph P-16 reads "As this element in the plan is one of those not under the control of Uganda there are dangers about too optimistic aid assumptions. Certainly in the long run, Uganda must expect to develop predominantly through creating high rates of domestic savings. Por contingency purposes it is therefore necessary to allow for some more pessimistic prospect." If aid were to continue to share the same proportion of the public sector development Programme as in the first plan, then the foreign contribution would only be £38 million compared to the target of £50 million. But in absolute terms, even the more pessimistic assumption of £38 million represents 122^ increase on the aid -received in the first plan. Having regard to the fact that the level of international aid has now levelled off, it seems extraordinary that an increase of this magnitude should be postulated as the lower limit of aid to be expected without any argument or substantiation whatever. Subject to more detailed examination, this too seems to be a gross over-estimate.

(vi) Foreign Private Capital. Paragraph 2.17 reads "The expected foreign contribution to the private sector is modest." This is certainly true if we look at the Uganda private sector as a user of funds (only £15 million) but this does not take account of the £20 million of capital which is assumed to be obtainable from the foreign private sector for joint investment through parastatal channels. The total of £35 million is not quite so modest, and the absence of any indication of the basis on which this figure is calculated is a little disturbing.

I can now summarise the initial hypotheses with which I approach the study as follows:

(i) that the plan almost certainly overestimates the total of resources available from private savings plus budgetary savings plus foreign aid;

(ii) that this will cause considerable pressure to increase monetary expansion rather than to reduce the targets;

(iii) that the scope for domestic credit expansion without increased external reserves is negligible;

(iv) that domestic credit expansion is necessary for the planned growth to take place;

(v) that no provision has been made in the plan for any increase in external reserves and that any such increase would be inconsistent with the projected balance of payments.

The object of the research can be summarised as refining these hypotheses and examining their implications.

PART II

The Tools of Analysis.

In this section I want to submit for consideration four propositions which will serve as tools for analysis.

(i) Identification of the Money Supply. As will become clear in subsequent analysis the identification of the assets which comprise the money stock is a necessary preliminary for the use of the model which I have in mind. I propose to use a criterion which I have justified at length elsewhere[1] and to identify the money stock as those assets which being drawn upon to finance an excess demand in the market for commodities, necessarily impart zero excess demand in the market for loans. This is a criterion relating to the means of payment function of money rather than its asset function and in essence it means that for any asset to qualify as money it must operate so as to effect a payment in precisely the same way as does a hand-to-hand payment in currency.

All economists are agreed in including demand deposits (checkable deposits) in the money supply although the transfer of deposits by cheque is not identical with the transfer of hand-to-hand currency and, indeed, strictly speaking it is not a transfer at all. In fact, it consists of a set of transactions: debtor/debtor's bank; debtor's bank/central bank; central bank/creditor's bank; creditor's bank/creditor. We are only justified in regarding this set of transactions as being equivalent to the use of a medium of exchange if their effect on the rest of the system has a zero sum. In a homogenous banking system this is the case, hence demand deposits are regarded as constituting part of the money stock. The inclusion of other types of deposits in the same institutions and the whole range of assets usually described

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1. "The Supply of money and its Control. Economic Juurnal June 1964.

as quasi-money or near-money, has always been the subject of considerable controversy. It is my contention that the use of the neutrality criterion described above unambiguously resolves the confusion even though, as with most economic aggregates which are conceptually pure, there may be some difficulty in actual statistical application.

If I were doing this exercise in respect of the United States monetary system in which differential ratios are legally required against different types of deposits, I should exclude all but demand deposits from the money stock. This is because the neutrality criterion is not satisfied in respect of time deposits: a transaction financed by drawing upon a time deposit which gives rise to a demand deposit, causes a repercussion in the market for loans because of the adjustment in reserves which the banks are required to make. In the British banking system, however, the evidence suggests that the banks pay no regard to the distribution of deposits between categories in determining their reserve, so that a transaction which draws upon a time deposit and gives rise to a demand deposit is neutral. It is my understanding that the position is similar with regard to the major banks operating in East Africa and I therefore propose to include the total deposit liabilities of the commercial banks in the money stock for use in the model but the conventional I.M.F. concept will be used for international comparison.

(ii) Significance of a Fully-extended Banking System. I propose to use as the model for the determination of the money stock a marginal co-efficient of expansion relating the cash base of the system to the level of deposits thus

$$\triangle D = \frac{1}{a + b} \triangle C$$

where a and b are respectively the propensities of the public and the banks to hold cash relative to deposits. Statistical evidence is available to substantiate the stability of the first propensity. The second will be taken to be the total of: banks' cash, balances with the monetary authority; net overseas balances; and the average of the monthly overdrawn position during the preceeding year. The inclusion of the latter element is an attempt to reflect the de facto ability of the major banks' to borrow from their head-offices up to a certain amount. In other words we include in their reserves a line of credit from head offices currently of the order of £6 million. Clearly this does not give a stable value for b but this is a reflection of the facts. The value of b is, however, confined within narrow limits in contrast with the secular decline over the last twenty years during which the money supply increased from £60 million to £210 million while the cash base of the system was of the same order of magnitude (£50 millions) at the end of the period as at the beginning. This must be taken as a unique process; it cannot be the repeated. The relationship between the money supply and the reserves of the system is shown in the attached graph from which it will be seen that the movement consists of two strikingly contrasting processes: the positive response of the money supply to accumulating sterling reserves up to 1954 and, thereafter, continued expansion of the money supply in spite of heavy losses of reserves. The co-efficient of expansion of money with respect to reserves has increased during the period from little over one to over four. It can increase no further in the short run. Clearly the banks cannot reduce their reserve ratio any further as they are already overdrawn vis-a-vis their offices and it is doubtful whether the ratio of public's cash to deposits can be reduced further except secularly though this is something requiring study.

It follows from this that monetary expansion in the future is almost entirely dependent upon expansion of the reserves. But there is a more significant point to which I recently ventured to

suggest was not fully appreciated by many economists. It is the point which is enshrined in the D.H. Robertson paradox "You can't take any money to the banks that isn't there already". Robertson wats taIking about a banking system which was fully extended in the same way as I am claiming that the East African banking is fully extended5 that is to say one in which the co-efficient of expansion has reached a maximum. Once this stage has been reached, it is no longer true that savings which are embodied in the form of bank deposits enable the banks to lend more money. In short we have to distinguish between the development stage of banking (e.g. Britain, 19th Century; East Africa the post-war period to i960) in which it is possible to make a massive substitution of deposits for cash as a medium of exchange, a process which not only allows the banks to lend out the savings embodied in bank deposits but allows them to expand credit by some multiple of any cash acquired. Once this process has come to an end, savings embodied in bank deposits amounts to "hoarding". Just as savings effected by failing to spend currency received gives rise to currency hoarding, so savings effected by failing to transfer deposit money received gives rise to deposit money hoarding. Once the banking system has become fully extended the lending capacity of the banks is indeterminate with respect to savings. This is a corollary of bank deposits having become a medium of exchange; if they satisfy the neutrality criterion defined earlier then their transfer or non-transfer can not be reflected in the market for loans.

I am not, of course, denying that the banks are continually making loans; what I am saying is the level of the revolving fund of bank credit which is continually being re-paid and re-loaned is uniquely determined by the co-efficient of expansion and the cash base. No matter how much savings are increased in this Situation there will be no additional funds available for the banks to lend because all that a savings decision does in a fully extended banking system is to reduce the velocity of circulation of bank money. The institutional development which is necessary to offset the deflationary effects of such hoarding is the establishment of non-bank financial intermediaries and money markets which induce the owners of idle bank deposits to transfer such deposits, through these institutions, into activity.

I regard this as a central point in the whole analysis.

One of the most significant conclusions which follows from this is that any protection into the future of the rates of growth or monetary variables experienced in the post-war period are utterly invalid. A failure to understand this crucial point of inflection of the characteristics of the financial system in East Africa has led to a great deal of erroneous prognostication, some of which is embodied in earlier EDRP papers. The second most significant point is, of course, the conclusion that no monetary expansion can take place without an increase in the external reserves of the sjptam The third significant point is that such credit expansion as is required to facilitate growth must take the form of increases in the velocity of money rather than an increases in the supply of money itse'lf. This centres attention on the potential development of non-bank financial intermediaries and the establishment of money markets.

(iii) Transition to Central Bank Responsibility. The final proposition which will be used as a tool of analysis is that with the introduction of central banking the responsibility of the monetary authority, previously confined to a liability to redeem currency in foreign exchange, is significantly extended. Although the additional liabilities in the balance sheet consist only of relatively small liabilities to the Government and liabilities to the commercial banks, the central bank's responsibility is not confined to these. In fact it takes over from the commercial banks the responsibility of finding foreign exchange

1. Social Science Conference Papers, Jan. 1966«

as required, the theoretical limit to this responsibilit5r being the amount of money rather than as previously, the amount of currency. This fundamentally alters the assessment of the adequacy of foreign exchange, a point which seems to have been overlooked in many of the estimates of the "excess reserves", which the central banks would have at their disposal.

Part III. The Model.

> "Existing analytical studies rarely succeed in integrating monetary and credit factors in the explanation of income or of payments developments, an adequate theoretical basis - in particular, a quantitative basis - for these conclusions seems to be lacking."-

This is a quotation from an article written in 1957 by J.J. Polak, Deputy Director of the Department of Research and Statistics of the IMF. Unfortunately I missed seeing this article until very recently here in Uganda, but I regard it as a major breakthrougii in the application of monetary theory to the problems of an open economy. In the meantime the best I was able to do was to work out (in association with Dr John Loxley) an elaboration of the combined effects of the traditional Keynesian income theory and the tr.aditional banking theory; this has proceeded in a number of stages starting with a basic equation contained in an EDRP paper by John loxley, and has hopefully reached a final Version in a Joint note which will appear in the next issue of the East African Economics Review.

In building up this equation it is convenient to take it in two steps. There is no difficulty about expressing the ordinary Keynesian effects of an increase in credit (F) on the external reserves: we assume that some proportion-of the credit- is used directly to finance external expenditure (e) and that the rest (1-e) is spent locally and this expenditure is multiplied by the Standard income multiplier $\frac{1}{m+s+t}$ where s, t and m respectively represent the marginal propensities to import, save and be taxed. Applying the marginal propensity to import to the indirect element and adding it to the direct elemcnt we have:

$$eF + \frac{m}{s+t+m}$$

This takes into effect the direct effect of Imports and the indirect effect induced by higher income levels, but we cannot exclude the possibility that the expenditure is on investment which has the effect of stimulating exports (or reducing imports); we therefore add a term (E) to our equation reprcsenting the value of any increased exports (or import substitution) resulting from the Government expenditure, in order to get the net effect of the balance of payments (Z) as follows

$$z = eF + m \frac{F(1-e)}{+ t + m} + E$$

We now have to add to this the effect of credit expansion based on the increase in primary money (an increase in the liabilities of the central bank or currency authority to the commercial banks)

1. Monetary Analysis of Income Formation and Payments I.M.F. Staff Papers Vol 6. 1957-58 and. (with L. Boissoault) "Statistical Application[1],' Sfaff Papers, Vol. 7. i960.
2. EDRP 90 "Sterling Reserves and the Fiduciary Issue in East Africa".

on which the banks will be able to extend credit, The ordinary coefficient of expansion based upon the propensity of the public to hold cash and the reserve-ratio of the banks is inadequate in this case because we have the external "leak" to consider. What we have to do is to concoct a ccmprehensive coefficient of expansion which takes into consideration not only the leak of cash into the pockets of the public and the leak of cash into bank tills required by the reserve ratio, but also the import leak occasioned by the higher level of income resulting from the domestic expenditure financed from this secondary expansion of credit. This coefficient, when applied to the excess reserves left over after the Z element has worked itself out, namely (1-b) F-Z), is that which gives a level of loans (1) which equates retained reserves to required reserves, thuss

$$_{(1\_bJ\ (F.z)} - iL \bullet \qquad + b \quad 1$$

from which we get; $L = \left[\frac{a+b}{1-b}\right]^{\frac{1}{s+t}} \frac{(1-b)(F-Z)}{m}$

The first term being the appropriate coefficient. Adding L to Z the total loss of reserves (X) is as follows

$$\underline{X} = eF + T \quad s + t \frac{c(1-b)(F-Z) + cE^{\wedge}}{+ ;n} \bullet EL$$

Inserting actual values for the parameters for East Africa 1960-1964 this expression works out at 0.89 F

It is clear that the value of e is crucial. Yet this is a factor which is normally left out of the general treatment of multiplier analysis., A similar reduced multiplier is used by McLeod in an article^ which has only recently come to my attention and which develops a model incorporating a similar combination of income effects and monetary effects to the above. McLeod, however, refers to his reduced multiplier as a "c 9dit multiplier" as opposed to an "export multiplier". With 3 credit multiplier there is an external drain before the first round of th income generating process because part of the credit is spent externally; in the case of an increase in export receipts the whole of the initial amount becomes income in the domestic economy without reduction. It seems to me, however, that this reduced multiplier is more general than is implied in calling it a credit multiplier; it is, in fact, an "expenditure multiplier." It can be fittecl in to the general context of differently based niultipliers as is shown in the table below:

	First Exports	Impact of Initial Expenditure	Increase of X ins Eisposable —Income
Closed System	x	x	(l-s)x
Open System	x	(l-e)x	(l-s-e)x

This kind of static calculation of the effects of the given amount of credit creation on the external reserves may have its place in the general analysis of the problern but it is clearly necessary to go beyond this and build up a complete model. This could be done of course by making investment, government expenditure and exports autonomous variables; but the more we consider the Situation of an open economy the less convincing.do the domestic leaks appear to be.

Tax revenue being one of the major constraints on development plana it is hardly likely that an increase in tax roceipts will not

1. McLeod, A.N., "Credit Expansion in an Open Economy Economic Journal, Sept. 1962.

be reflected immediately in an increase in expenditure. We can therefore eliminate t from our model. Furthermore, as far as domesticaly financed private investment is concerned, is it not the case that it is fincnced largely by accumulated profits? Mr. Bosa's recent survey of small enterprises gives clear confirmation of this within the range examined.[1] To the extent that this is true the Keynesian divorce between the decision to save and the decision to invest is of very much less significance than in developed economies. For the same reasons the existence of a liquidity trap, which gives such significance to the Keynesian approach, is not of much importance in East Africa. Certainly in the version of the Keynesian model that I teach to students in respect of an open economy like that of East Africa is that the savings and taxation leaks can be virtually ignored in order to concentrate on the external leak, and that asset choice and interest rate effects a hardly significant.

McLeod, in his model, makes his propensity to consume a propensity to spend which includes expenditure on investment as well as on consumption. His propensity to save, which is one minus his propensity to spend, must therefore be a propensity to hoard. But it is only in Polak's approach that the full implications of eliminating the domestic leaks becomes apparent. It is the Polak model that I particularly want to subject to the criticism of my colleagues. The great beauty of the model is its simplicity: there is one basic assumption from which all else follows. It is that the velocity of circulation of money is constant. The first reaction of all good Keynesian will be to reject any such assumption as quantity theory heresy, but Polak shows that the assumption of a constant velocity of money combined with, and properly tied into, income analysis is a very different proposition from the quantity theory based on constant velocity in the absence of income analysis. Moreover it undoubtedly gives an amazingly powerful analytical device, and variations in velocity can be incorporated explicitly in projections or deduced from residuals when applied to passed events. The characteristics of the model are best specified by direct quotation from Polak as follows:

"The central equation of the system is

$$Y(t) = Y(t-1) + MO(t) \qquad (1)$$

in which Y indicates national income (money value), MO is the increase in the quantity of money, and t refers to an income period, i.e. the fraction of a year indicated by the ratio of money to annual income. This equation may be interpreted in either of two ways: (1) If the income velocity of money is constant, the income of the next period will equal the current period's income plus the increase in the quantity of money.

(2) If the income velocity of money is constant, the quantity of money will increase from one income period to the next by the same amount as income.

The increase in the quantity of money is then split into its constituents, the increases in (net) foreign assets (R) and in (net) domestic assets (D);

$$MO(t) = R(t) + D(t) \qquad (2)$$

The balance of payments equation

$$R(t) = X(t) - M(t) + C(t) \qquad (3)$$

states that the increase in reserves (R) equals exports (X) minus imports (M) plus capital movements C(t).

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1. G. Bosa. "Results of a Survey of Small-Scale Enterprise in Uganda". E.D.R.P. 111.

The combination of (2) and(3) yields an explanation of the change in money, and thereby of the change in income, in terms of three variables considered autonomous and of imports;

$$M0(t) = X(t) + C(t) + D(t) - M(t) \qquad (4)$$

In what follows, the three autonomous terms will often be used in combination, for which the term Q(t) isused;

$$Q(t) = X(t) + C(t) + I(t) \qquad (5)$$

Imports are expressed as a function of income

$$M(t) = nY(t) \qquad (6)$$

From (6), (5), (4), and (l) we find

$$(1+m)\ Y(t) = Q(t) + Y(t-l) \qquad (7)$$

Dividing by (1+m) and eliminating the terms with Y in the righthand side of (7) by iteration, we obtain

$$Y(t) = \text{Äill}_{+}\ \frac{Q(J-1L_{+}}{1+m}\ \frac{\text{\_Qitz2i}}{(1+m)}\ \frac{\text{.....}}{(l+m)^{J}} \qquad (8)$$

and"the corresponding import equation,

$$'_{M}(t) - \frac{aSill}{1+m} + \frac{SQ\ddot{U}llU_{+}}{(1+m)^{2}}\ \frac{mQ(t-2)}{(1+m)^{3}} \qquad (g)$$

These two equations express Y and M in terms of the autonomous determinants of the system.

The conclusions resulting from the model are summarized by Polak as follows;

I A. *A* lasting increase in exports will, by itself, i.e., without credit expansion or relaxation of import restrictions, gradually bring about

(1) the same percentage increase in the rate of money national income;
(2) an increase in the rate of imports equal to the increase in the rate of exports;
(3) an increase in the quantity of money and in foreign assets of the order - depending on the country concerned - of 50 to 300 per cent of the increase in the annual rate of exports.

-A lasting increase in the rate of credit expansion by the monetary system will, by itaelTT graduallyTrTng about

(1) the same increase in the rate of money income and of the stock of money as would be produced by a lasting increase in exports of the same size;
(2) an increase in the rate of imports equal to the increase .in the rate of credit expansion;
(3) a rate of loss in reserves that will approach the rate of credit expansion;
(4) a total loss in reserves equal to the cumulative credit expansion minus the increase in the quantity of money indicated in I *A* (3).

II ***A.*** *A* temporary increase in exports will, by itself, bring about

(1) a temporary increase in money income which, aggregated over all periods will be of the same proportional size as the increase in exports;
(2) a temporary increase in imports which, aggregated over all periods, will be of the same absolute size as the increase in exports;

(3) a temporay increase in money and reserves.

B. A temporary expansion of credit (terminated, bat not reversed, affter the end of, say, one year) will, by itself, bring about
   (1) a temporary increase in money income and the stock of money;
   (2) a temporary increase in imports and a permanent reduction of reserves equal in size to the credit expansion.

These results are shown in Fugure 2 which is adapted from Polak's 1957 paper to take account of the removal in the i960 paper of a time lag of one period of imports on Q. This diagram clarifies the terminology used by Polak in the above which is somewhat confusinö. In the text, Polak says "As statistically measured, credit expansion is a net concept, the difference between credit outstanding at the end and at the beginning of a period." This is unambiguously a rise in the level of (say) bank advances. And in I.B. above, Polak postulates "a lastins; increase in the rate of credit expansion" which, consistantly with the above meaning of credit expansion would appear to mean an increase in the rate at which the level of advances is rising. This is contrasted with, II.B., "a temporary expansion of credit (terminated, but not reversed, after the end of, say, one year)" Here I do not understand the meaning of "not reversed". However it is clear from the conclusions and the diagram, that I.B. is commensurate with a lasting rise in the level of exports and II.B. is commensurate with a temporary rise in the level of exports. I.B thus means an annual increase in advances;IIB means a once and for all increase

The period analysis of these processes are worked out by Polak in terms of the coefficients for Q(o) Q(-l) Q(-2) and Q(-3) used in the determination of M(o) and Y(o) for a ränge of values of *Y* between 2 and 10 and of m between 0.10 and 0.50 A reduced Version of Polak[1]s tables is presented in Tables 1 and 2. In order to apply the model to the past data for any economy it is necessary only to identify the annual Qs over the period and apply the appropriate coefficient for the value of m and v. This may be quite a task though, because of the need to nake various adjustments to the balance of payments figures and problem cf the errors and omissions figure.

But given that the Qs can be identified, the value to be put upon v raises problems. First of all it should be made clear that the identification of the circuit period with the speed of transmission of an impulse through the model is not a repetition of the fallacy (which has been refuted)! of identifying the circuit period of .active money with the transmission period. The latter can, and does, differ from the former and is unlikely to be constant.

The circuit period of active money is determined by the decision lags:-- consumption on income; Output on expenditure; dividends on profits; none of which has anything to do with the factors determing the active circuit period but all of which will be reflected in overall velocity. If, however, we make overall velocity constant by assumption, then the use of the overall velocit period as the transmission period is logically consistant but constrains the three decision lags to conformity with the average rate of turnover of the total money stock.

1. The fallacy is contained in e.g. s Goodwin, R.M. "Aspects of the multpplier and Accelerator" Essai.ys in Honour of Alvin Hansen, New York, 1948; it is refuted in my Theory of Money.

2. Metzler L.A. "Three lags in the Circular Flow of Income" Essays in Honour of Alvin Hansen, New York 1948.

If we conceed the identification of the transition period with the overall velocity period, have we any way of knowing that we have got the "right" period? There are two points here. Eirstly the definition of Money, as we have seen, can be a matter of opinion and the concept I use is not "right" by Polak's useage. Secondly no definition can ensure that the Classification adopted will be identical with the amount of money which is actually performing the income transactions in question. There may be some idle money which is irrelevant to the calculation of turnover and there may be some savings deposits which are drawn upon (though only infrequently) for income transactions which are'excluded though relevant.

For these two reasons the apparent velocity may differ from the relevant velocity and it thus appears that the parameter determining the speed of transmission of an impulse through the model is arbitary. This would be a serious defect if it were not for the fact that Polak's figures (lables 1 and 2) show that the length of the transmission period v for values of the marginal propensity to import of 0.3 or higher is insignificant in it effects over a three year. period. Thus with a marginal propensity to import of 0.35 (plausible for East Africa) a doubling of velocity from 3 to 6 cause the sum of the coefficients to change from 0.97 to 1.0. It seems that not only must the value of v be arbitary but that it doesn't much matter what value you give it within the plausible ränge.

This would seem to suggest a significant modificati.on to the Polak model - we no longer need a value for velocity on which to base the timing of the process of adjustment. Eree from this constraint we can determine the "best fit" period by correlation analysis of past data and plug in projected changes in the value of v in terms of their equivalent units of Q. Nothing eise need be altered as far as the manipulation and application of the model is concerned; so long as we retain the assumption that there are no domestic "leaks" the results will be the same as Polak's, but the theoretical basis of the model can now be reformuleted without an assumption of constant velocity thus;

In an economy such as those of East Africa, internal leaks can be disregarded and attention concentrated on the external leak, which is large.

Erom this it <u>follows</u>;

(i) that changes in imports and income over time, resulting from initial changes in the level of exports, capital inflows or credit, can be calculated by applying a best fit transmission period;

(ii) that, for a given institutional framework the velocity of oirculation will be constant because the only leak in the model causes the quantity of money to change not its velocity;

(iii) that secular changes in velocity due to projected institutional changes can be introduced into the model in terms of Q.

Is this a return to Say's law or a sensible modification of Keynesian analysis?

It remains to summaries the intended application. SuLjcet to discussion, the intention is as follows;

(i) application to East Africa 1956/65 with particular reference to the consistancy of estimates of capital items in the balance of payments.

(ii) application to Uganda for the period for which balance of payments estimates can be obtained.1

(iii) application to the Uganda Second Pive Year Plan using alternative hypothetical exports and capital inflow figures, in order to deduce the appropriate rate of credit expansion and examine the implications;

(iv) the same, in less detail, for the Tanzanian and Kenyan plans; in order to deduce the prospects for monetary and fiscal harmony.

1= Por some vears estimates were made but not published.

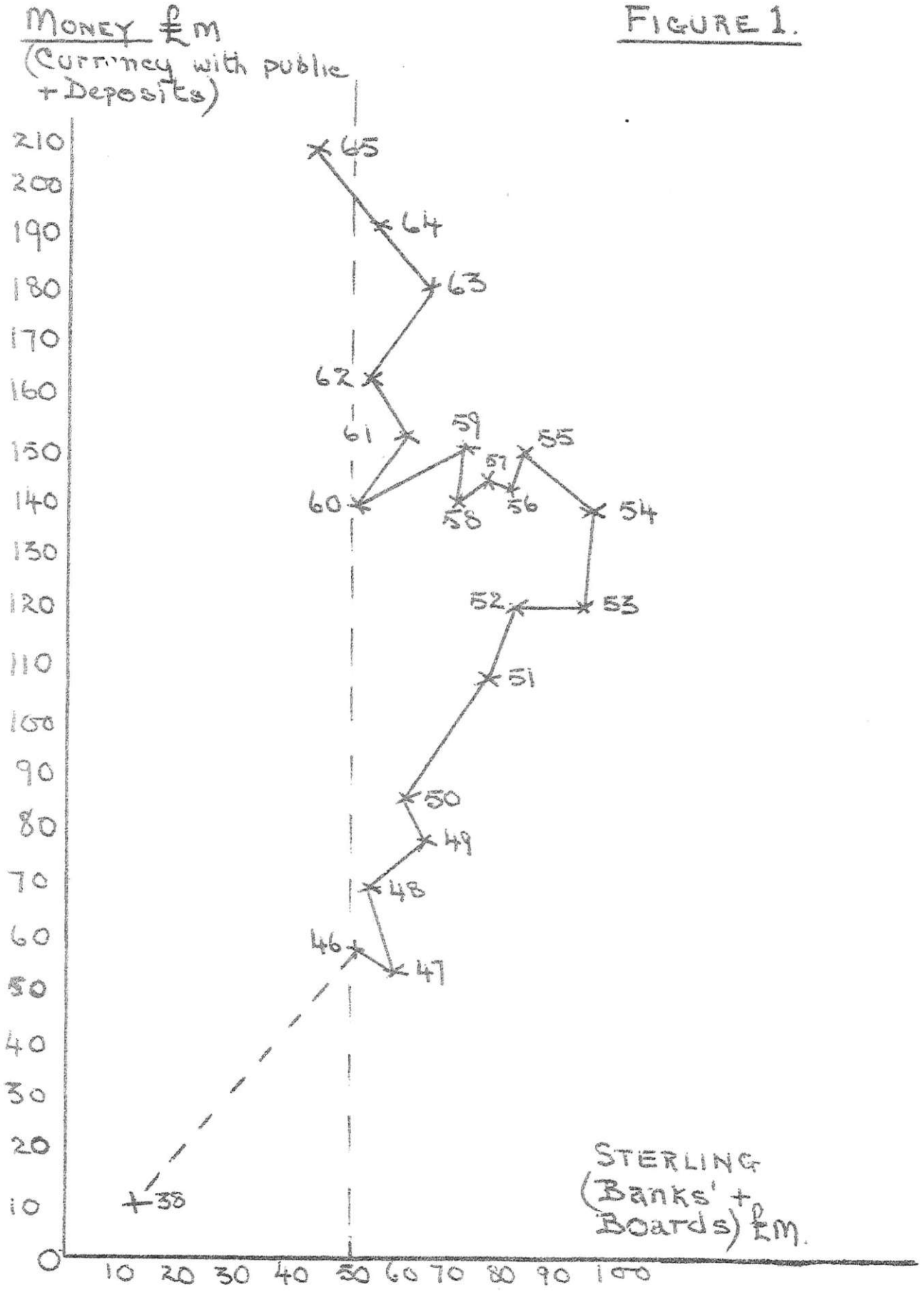
TABLE I. COEFFICIENTS FOR Q(0), Q(-I), Q(-II), AND Q(-III) IN THE DETERMINATION OF M(0)

v	m	Coefficients for Q(0)	Q(-I)	Q(-II)	Q(-III)	Sum
2	0.10	0.13	0.15	0.12	0.10	0.50
	0.30	0.32	0.28	0.16	0.10	0.86
	0.50	0.44	0.31	0.14	0.06	0.95
3	0.10	0.17	0.21	0.15	0.12	0.65
	0.30	0.39	0.33	0.15	0.07	0.94
	0.50	0.53	0.33	0.10	0.03	0.99
4	0.10	0.21	0.25	0.17	0.12	0.75
	0.30	0.46	0.35	0.12	0.04	0.97
	0.50	0.60	0.32	0.06	0.01	0.99
5	0.10	0.24	0.29	0.19	0.11	0.83
	0.30	0.51	0.35	0.10	0.03	0.99
	0.50	0.65	0.30	0.04	0.01	1.00
6	0.10	0.27	0.32	0.18	0.10	0.87
	0.30	0.56	0.35	0.07	0.01	0.99
	0.50	0.70	0.28	0.02	0.00	1.00

TABLE II. COEFFICIENTS FOR Q(0), Q(-I), Q(-II), AND Q(-III) IN THE DETERMINATION OF Y(0)

v	m	Coefficients for Q(0)	Q(-I)	Q(-II)	Q(-III)	Sum
2	0.10	1.33	1.51	1.24	1.03	5.11
	0.30	1.07	0.93	0.55	0.32	2.87
	0.50	0.89	0.62	0.27	0.12	1.90
3	0.10	1.71	2.06	1.55	1.16	6.48
	0.30	1.32	1.10	0.50	0.23	3.15
	0.50	1.06	0.66	0.20	0.06	1.98
4	0.10	2.08	2.51	1.72	1.17	7.48
	0.30	1.53	1.17	0.41	0.14	3.25
	0.50	1.20	0.64	0.13	0.03	2.00
5	0.10	2.42	2.87	1.78	1.11	8.18
	0.30	1.71	1.19	0.32	0.09	3.31
	0.50	1.31	0.60	0.08	0.01	2.00
6	0.10	2.74	3.16	1.78	1.01	8.69
	0.30	1.87	1.16	0.24	0.05	3.32
	0.50	1.39	0.56	0.05	0.00	2.00

FIGURE 1.


MONEY £m
(Currency with public + Deposits)
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
65
64
63
62
61
59
55
57
60
58
56
54
52
53
51
50
49
48
46
47
38
STERLING (Banks' + Boards) £m.
10 20 30 40 50 60 70 80 90 100

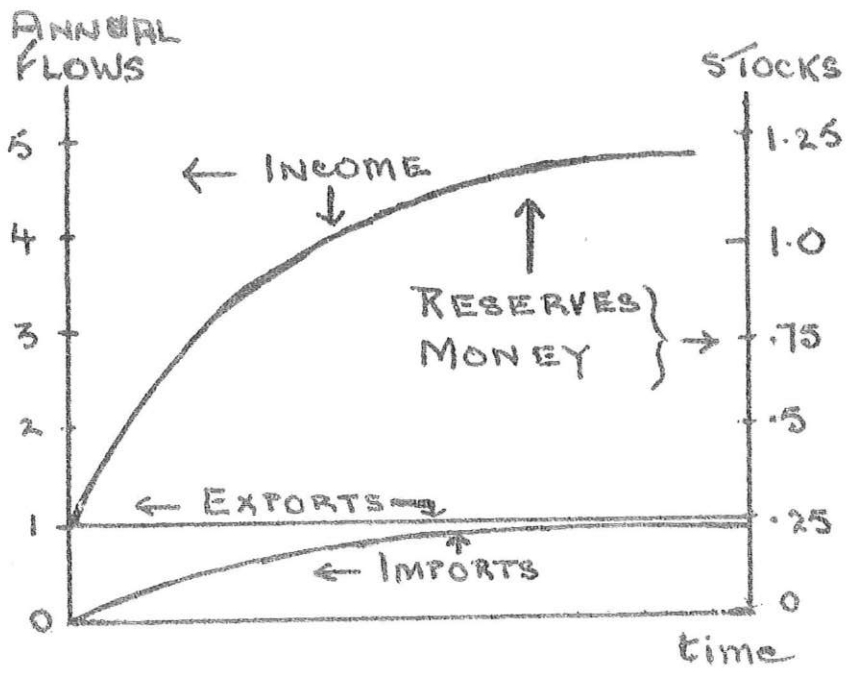


FIGURE 2A.

LASTING INCREASE IN EXPORTS. (I.A)

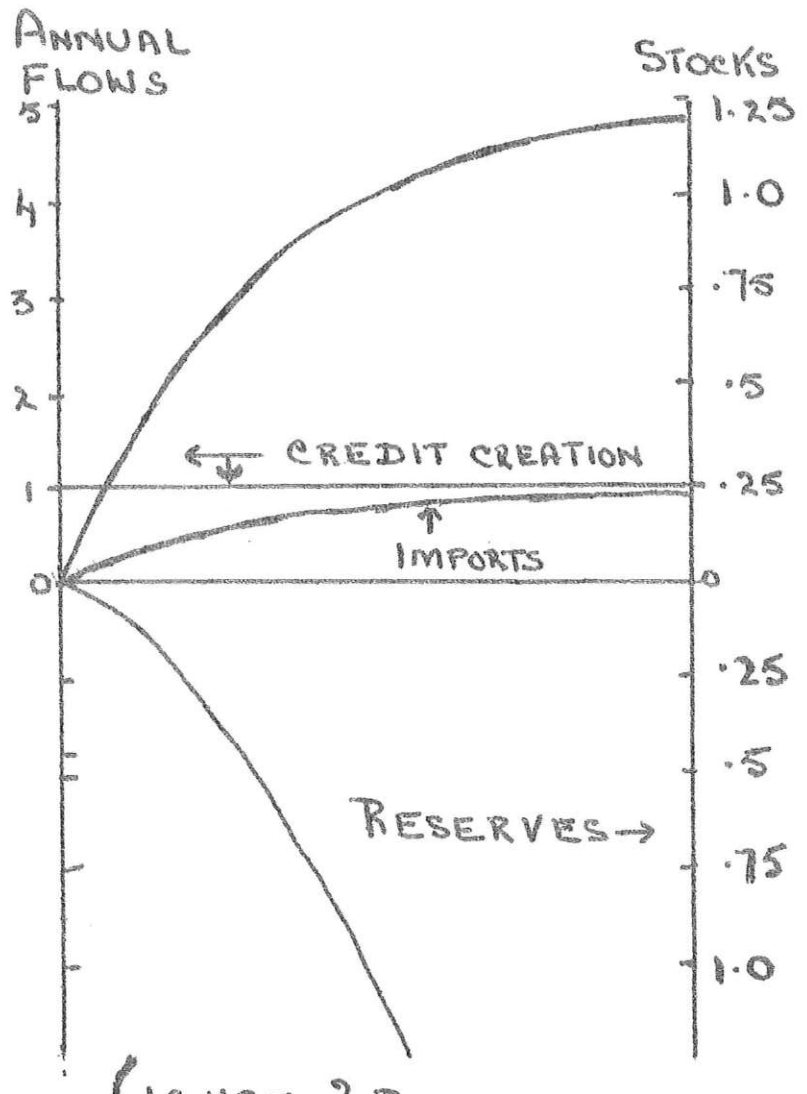


FIGURE 2B

LASTING INCREASE IN CREDIT CREATION. (I.B)

FIGURE 2