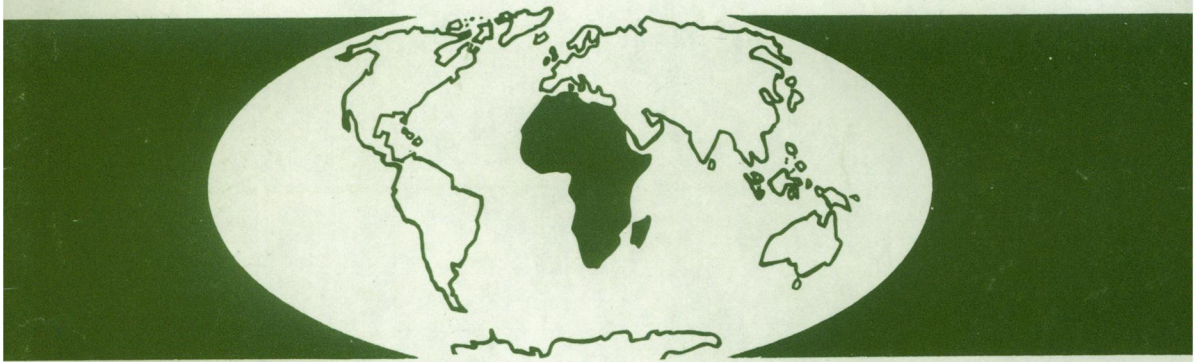
Finafrica Bulletin



CASSA DI RISPARMIO DELLE PROVINCIE LOMBARDE

4 - 1975 - II

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THE LIQUIDITY POLICY OF DEPOSIT BANKS IN KENYA (*)

1. Introduction

In Kenya the sources of money creation were almost entirely exogenous to the central bank, during the period under survey, as can be seen from the tabulation below (million Kenya pounds).

	1968	1969	1970	1971	1972
Balance of payments:					
Balance of monetary movements	+ 10.2	+ 22.8	+ 16.0	— 27.8	+ 9.5
Money creation by the Treasury	— 7.3	— 18.1	— 8.9	+ 30.6	— 1.0
Change in currency stock	+ 2.9	+ 4.7	+ 7.1	+ 2.8	+ 8.5

Furthermore, both the Treasury cash requirements and those of foreign trade can be taken to be subject to strong seasonal fluctuations. For these reasons, it should be most interesting, from the point of view of the mobilization of domestic savings and, ultimately, of the economic system's capacity of balanced growth, to examine the seasonal liquidity policies of the deposit banks.

To this end figures obtained from the monthly returns of banks operating in Kenya, during the period October 1967 to February 1973, were consolidated, and then the trend component was removed by the method of first differences. This yields the flow values on which the research is based. Before proceeding any further, however, it is advisable to identify the characteristics of the private demand for liquid financial assets and of some components of the monetary base.

2. Private demand for liquid financial assets in Kenya

In analysing private demand for liquid financial assets in Kenya during the years 1967 to 1972, we have proceeded by successive approximations. To this end we made an "as if" assumption: we examined the demand for

(*) This article contains some of the conclusions of a broader research by the same author. See LORENZO FREDIANI, *The liquidity policy of deposit banks in Kenya*, published in the series « The Credit Markets of Africa », Cassa di Risparmio delle Provincie Lombarde, Milan 1975.

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currency as if there were within the economic system two separate circuits, each with autonomous flows of monetary and financial assets originating in the desire of holders of one type of asset to exchange it for another having different characteristics; the difference between the two circuits is that in one case this exchange involves negligible, and in the other fairly high costs. Let us first consider asset holders for whom transaction costs are low. At given levels of transactions, they will determine their average cash holdings in the light of the relation which, at equivalent certainty, exists between the rates of return on financial assets other than currency and the costs of acquiring, selling and managing such other assets (1). If these costs are higher than expected rates of return, it would not be profitable for a hypothetical individual to exchange his cash holdings for other financial assets. In that case the volume of cash outside banks would be relatively large. In the contrary case of rates of return higher than transactions costs, it becomes profitable to reduce cash holdings. It seems reasonable to assume, therefore, that the average size of cash balances is negatively correlated with the existing difference between expected rates of return in conditions of equivalent certainty, and directly correlated with transactions costs.

If the volume of transactions is assumed to vary, then of course the demand for money will vary in the same direction, but at decreasing speed. All this applies with even greater force to people whose transactions costs are high. It follows that in such conditions an interest rate policy for purposes of the mobilization of savings is likely to be rather ineffective unless it is combined with a change in the composition and the characteristics of financial assets in circulation; this should make it easier to diversify holdings and thereby should reduce the degree of risk for each separate portfolio and, ultimately,

(1) Applying inventory theory to the demand for cash, transactions demand for cash is directly proportional to the square root of the expected volume of payments (transactions) and to the cost of converting financial assets into cash, and inversely proportional to the square root of the opportunity cost of the desired cash holding. At a constant level of transactions, therefore, the quantity of money which people wish to hold will be an inverse function of the rates of return on financial assets, and a direct function of the cost of their acquisition, sale and management. Assuming a variable level of transactions, the demand for money varies in the same direction, though by less than proportional amounts. See James Tobin, "The Interest-Elasticity of Transactions Demand for Cash", *Review of Economics and Statistics*, August 1956, and William J. Baumol, "The Transactions Demand for Cash: An Inventory Theoretic Approach", *Quarterly Journal of Economics*, November 1952.

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widen the time horizon of private individuals and also the margin between opportunity costs (or average rate of return) and transactions costs.

To the extent, therefore, that our conclusions are valid, the public's marginal preference for holding cash and the take-up of the deposit banks financial liabilities and hence their liquidity management, are influenced by the following factors:

(a) the expected rates of return on the deposit banks' financial liabilities and their degree of liquidity;
(b) transactions costs;
(c) the time horizon of individuals;
(d) the expected rates of return and the degree of liquidity of similar financial assets obtainable abroad.

3. The main institutional factors influencing the liquidity management of deposit banks in Kenya

As in Kenya the deposit banks' circuits of financial flows are rather inefficient, their capacity of credit creation is not likely to be much above unity. But then, in case the liquidity position of banks (2) is computed gross of net interbank debit balances, the transfer of balances will give rise to creation of monetary base and, at the same time, to its more large-scale use. If, on the contrary, the liquidity position is computed net of net debit balances, then the transfer of a deposit from one bank to another will improve the use of monetary base and ultimately also the liquidity position of individual banks.

(2) In pursuance of Part IV, Section 18 of the Banking Act banks had to maintain a minimum holding of liquid assets, among which net interbank balances were comprised. According to the original interpretation of Section 18, net negative interbank balances had to be deducted from an individual bank's total liquid assets. Since 1 June 1972 Section 18 of the Banking Act has been interpreted in a somewhat different fashion. The monetary authorities made it clear that net interbank balances were henceforth to be considered in the computation of the liquidity position of an individual bank only if they were credit balances owned to it. In this connection it is useful to clarify that in the analysis the computation of the liquidity position has been made in three different ways, following a different treatment of interbank net balances. According to the "gross method" net interbank balances are taken into account only if they are positive. According to the "net method" they are always included in the calculation of the liquidity position. Finally, the "mixed method" is so called because it follows the practice of the Central Bank of Kenya, which used the net method until 1 June 1972 and then switched to the gross method.

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In these circumstances it may be assumed that when the monetary authorities decided in June 1972 to count net interbank balances as liquid assets only if they were positive, they meant—despite their simultaneous raising of the liquidity ratio from 12.5 to 15 per cent—to increase the domestic supply of financial assets other than currency. If this is so, the idea must have been to isolate the structure of domestic interest rates from those abroad, and to improve the efficiency of the banks' financial circuits. It would seem that in handing the deposit banks an instrument of potential money creation (an instrument the more powerful, the more efficient are the banks' financial circuits), the monetary authorities reckoned that the opportunity of higher earnings thus offered to the banks would induce them, at equal unit profit margins, to alter the composition of their loan portfolio. In the new circumstances it should indeed have been to the advantage of the banks to cut down on their lending to importers, thus reducing the marginal propensity to import of private business, and to increase the proportion of credit going to Kenya firms.

4. Spectral analysis of the loan-deposit financial circuit

Given that a bank's liquidity depends, at least in large part, upon the structure of the credit portfolio, it seemed right to look first at credits and, more precisely, at credits classified according to the private or public nature of borrowers. The spectrum estimates for the credit flows from banks to the public sector display a sinusoid of a different period and amplitude than that for total credits to the private sector. Since the intervals between peaks are longer and the differences between peaks and troughs larger in the public than in the private sector, it is likely that the average duration of loans to the public sector is longer, and that the speed of turnover of credit is higher in the private sector. In the latter group particular importance is to be attached to credits to industry and trade, as they show the most marked peaks. Since data for credits to sub-sectors of trade—export, import, domestic—happened to be available, the time series for each of them was subjected to separate spectral analysis. The results show well-defined peaks in credits to import trade, but much less marked ones in the other two series.

So much for the credit side of the loan-deposit circuit. On the deposit side, a first distinction was made between categories of depositors, and then for each of these a second distinction between categories of deposits: demand,

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time at 7 days' notice, other time, and savings deposits. For public deposits a quarterly pattern was ascertained. The same results were obtained for private deposits, except for "other time deposits", for which no peak points were found.

Different considerations must be made for the deposits of non-bank financial institutions. These, in fact, display a peak with a four-month period, for time deposits, while the spectrum for all the other types of deposits did not show any peak.

The periods for the aggregates of private and public deposits were the same as for public deposits, but the analysis of cyclical components of total deposits, the movements of which actually govern bank liquidity, did not produce relevant values.

Comparing these results therefore, with those obtained from spectral analysis of the series of public and private deposits, one can conclude that, thanks to recourse to non-bank financial intermediaries, the deposit banks succeeded in offsetting the influences of cyclic components on their typical source of funds.

After the availability of deposits (by categories of depositors and types of deposits) and the speed of turnover of credits, the next thing to analyse is the loan-deposit ratio.

With a view to identifying the influence of the private and the public sector on the time pattern of the relevant flows, the ratio was determined first with reference to private-sector loans and deposits, and then to total loans and deposits. Spectral analysis of the first series yielded no significant results, but for the second series a peak was found every three months. Comparison of the results obtained with the two time series suggests that the seasonal component in the loan-deposit circuit must be due to the public sector.

There is, then, proof of the existence of a seasonal component in the financial flows of the loan-deposit circuit; it remains to see whether it influences the banks' liquidity management and whether bankers take steps to offset seasonal variations. To this end, spectral analysis was applied to the cash ratio of the banks and to their demand for domestic and foreign currency, and significant seasonal fluctuations were ascertained.

The most noteworthy aspect of these results is how long it takes to bring deposits at the central bank into line with fluctuations in the flows of the

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loan-deposit circuit. This suggests that there may be frictions in the operations of liquidity management, which delay the adjustment of liquid assets to new conditions of credit demand and supply. To shed more light on this matter, it seemed useful to determine the recurrence of peaks in liquidity reserves, both total and by component assets.

For separate types of assets forming part of liquidity reserves, peak points were found in the time series at the following intervals (in months):

Free deposits at the central bank	4
Net domestic interbank balances	0
Net foreign interbank balances	0
Free deposits at the central bank + net interbank balances	3
Treasury Bills	2-3
Cash (total)	3

The last tabulation suggests that the time lags in the adjustment of the banking system's liquidity to seasonal fluctuations in the financial flows of the loan-deposit circuit are attributable to free deposits at the central bank, which seem to be the slowest to come into line.

Having now assembled the necessary information about the influences of seasonal and cyclic components on the time series of interest for our purposes, we can proceed to co-spectral analysis with a view to determining the intensity, the significance and the nature of relations between changes in two economic variables and the reaction speed of one given variable to variations in another.

5. Co-spectral analysis

Given that a deposit bank's liquidity management is conditioned by the movements of those economic magnitudes whose changes generate the financial flows characteristic of bank management as such, it seemed logical to start with the time series of deposits and credits, taking the respective totals first. An important point here is the four-month time lag between the peaks of deposits and credits, even though the coefficient of coherence between the individual cyclic components of the two series does not assume significant values.

While these results do furnish some very important information, such as the existence of an open circuit between credits and deposits, they also raise

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TABLE 1

SERIES I	SERIES II	Alignment	Gain	Coherence	Relations between series	
Deposits	*Credits*					
Total deposits	Total credits	4	11.0204	0.184224	max I	max II
Private demand deposits	Private-sector advances	4	0.442064	0.251781	max II	min I
Total private deposits	Total private-sector credits	4	0.310621	0.982523	max II	min I
Private + intermediaries' demand deposits	Total private-sector credits	4	5.34689	0.219954	max II	min I
Total deposits + bills payable + loan liabilities	Total credits	4	10.9959	0.183151	max I	max II
Liquid assets	*Credits*					
Acceptances, etc. + total credits	Free liquid asset holdings	2	485.517	0.302348	max II	min I
Acceptances, etc. + total credits	Liquid assets (mixed method)	2	711.125	0.433817	max I	min II
Liquid assets (mixed)	Total credits	0	0.000911	0.752868	max II	min I
Liquid assets (gross)	Total credits	0	0.000865	0.742498	max II	min I
Liquid assets (net)	Total credits	0	0.000902	0.749558	max II	min I
Free liquid asset holdings	Total credits	0	0.000990	0.637908	max II	min I
Liquid assets	*Deposits*					
Free liquid asset holdings	Total deposits	4	0.000018	0.108752	max I	min II
Liquid assets (mixed)	Total deposits	4	0.000041	0.266586	max I	min II
Liquid assets (gross)	Total deposits	4	0.000018	0.125421	max I	min II
Liquid assets (net)	Total deposits	4	0.000018	0.114303	max I	min II

some problems which make it advisable to take a closer look at some of the components of total deposits and total credits. So co-spectral analysis was applied to the series of private demand deposits and advances to the private sector, and those of the monthly totals of private deposits and private sector credits. Some of the results were unexpected. Peaks in private deposits were generally followed after four months by troughs in credits to private borrowers. This time pattern, together with the value of the coherence and gain coefficients, suggests that private deposits originate in temporary cash holdings of private firms, which withdraw them quickly as soon as they perceive wider investment opportunities or need more cash in their tills.

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TABLE 2

SERIES I	SERIES II	Align-ment	Gain	Coherence	Relations between series	
Interbank balances	*Deposits and credits*					
Due to banks abroad	Total deposits	3	0.0005970	0.050019	max I	min II
Due to banks abroad	Total credits	1	0.0184453	0.305546	max II	max I
Net interbank balance + free deposits at central bank	Total deposits	4	0.016020	0.07105	max I	min II
Net interbank balance + free deposits at central bank	Total credits	0	0.811240	0.614397	max I	max II
Interbank balances	*Securities and credits*					
Due by banks abroad	Total security investments	2	0.204463	0.365983	max I	min II
Due by banks abroad	Total credits	2	0.018364	0.002460	max II	min I
Due to banks abroad	Total security investments	4	0.089641	0.071222	max I	min II
Net interbank balance + free deposits at central bank	Total security investments	0	0.146018	0.0131374	max II	max I
Security investments	*Credits*					
Total security investments	Total credits	3	0.454015	0.093125	max II	min I
Total security investments	Private-sector credits	3	0.542321	0.115038	max II	min I
Treasury Bills + public securities + private-sector bonds	Total credits	3	0.273138	0.072748	max I	min II
Treasury Bills + public securities	Total credits	3	0.27428	0.074036	max I	min II
Treasury Bills + public securities + public credits	Public deposits	2	0.191913	0.0148533	max II	max I
Treasury Bills + public securities + public credits	Total deposits	0	0.026523	0.068927	max II	max I
Credits to trade	Net interbank balance	3	0.292177	0.0833539	max I	max II

In this context, theoretically, the banks could alter the composition of their loan portfolio; this would have an effect on the degree of risk of outstanding credits, but, given the behaviour of the public, would still fail to close the loan-deposit circuit.

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These conclusions find additional confirmation in the results of the cross-covariance and the cross-spectrum of the following pairs of series:

(a) total private + non-bank intermediaries' demand deposits, and total private-sector credits;

(b) total deposits + bills payable + loan liabilities and total private-sector credits.

At a four-month time lag and with non-significant coefficients of coherence, the peaks of the second series (credits) coincide with one trough and one peak of the first series. It looks as though banks prefer to meet their liquidity requirements from indirect sources.

At this point it may be well to summarize the conclusions reached so far.

(1) Deposit banks act only in part as intermediaries between units structurally in surplus and units structurally in deficit, they operate with open circuits of financial flows and prefer to borrow from other banks.

(2) The banks' liquidity policy and management are more responsive to medium-run than to short-run cyclic fluctuations, and more responsive, too, to changes in credits than in deposits.

(3) Banks have two reliable advance indicators for predicting future liquid assets requirements, as appears from the output data of the tabulation above; these are the ratio of private deposits to private advances, and the ratio of M_1 to total private-sector credits.

(4) In the conditions of Kenya's economic and credit system, it would seem that certain instruments which are supposed to work on a sort of widow's cruse principle, like special deposits and the statutory minimum liquid assets requirement, are applied not so much with a view to controlling aggregate domestic demand, as in the intention of helping to meet the Treasury's financial requirements. This interpretation also sheds new light on the monetary authorities' policy of controlling the structure of domestic rates of interest; this policy, too, can be seen as a helpmate in the overriding purpose of financing the deficit of the public sector.

The first conclusions of our analysis, and especially those showing a nil lag between credits and liquidity (see again the tabulation above), the coincidence of peaks in credit with troughs in liquidity, the openness of the loan-deposit circuit and the cash drain deriving simultaneously from the private and the

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public sector, suggest that a closer look needs to be taken at the policy of raising funds from sources other than the characteristic supply of deposit banks.

It seemed convenient to start with the potentially most productive sources, if only because of the chances they offer of expanding the system's monetary base by the endogenous decisions of bankers. Co-spectral analysis was applied, therefore, to the time series of interbank balances due to banks abroad, total credits and total deposits. It was found that a peak in the first of these series corresponds to a peak in credits, and a trough in the first series to a peak in deposits. This is clear proof of the banks' recourse to external sources as a typical instrument of liquidity management.

Additional proof was found in the results of co-spectral analysis of three other pairs of series:

(a) net interbank balance + free deposits at the central bank, and total credits;
(b) net interbank balance + free deposits at the central bank, and total deposits;
(c) net interbank balance, and credits to trade.

For the first and the third of these pairs it was found that peak points coincide, whereas for the second a peak corresponds to a trough.

The deposit banks' preference for interbank borrowing is also apparent in the comparative movements of interbank balances and investments. Taking the pair of series interbank balances due to banks abroad and total security investments (see tabulation above), and looking at the pertinent cross-covariance, cross-spectrum and parameter of alignment, it will be seen that peak indebtedness on the foreign interbank market generally occurs four months ahead of maximum recourse to asset management.

This behaviour may perhaps be explained by the following factors, among others.

(1) The securities portfolio was, in effect, only partially disposable, because part of the Treasury Bills and the whole category classified as "Others" had to be kept to satisfy the statutory minimum liquid assets requirement. Furthermore, Treasury Bills were, especially after the central bank stopped paying interest on the banks' free deposits, the only financial asset which made it possible to earn something on liquid reserves and, at the same time, to expand the supply of M_3 from the system's private and public sector.

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(2) For the reasons explained under (1), and probably also because of expectations of future yields, the banks preferred to liquidate their long-terms securities first, notwithstanding higher transactions costs.

(3) Recourse to foreign interbank markets made it possible, *ceteris paribus*, to keep more domestic currency in circulation.

(4) In a cyclical upturn and boom, lending was more attractive than security investment, and vice versa. In this connection see the results of co-spectral analysis between the security investments and the credits series, and between those of public securities + public credits, and deposits (tabulation above). At the height of a boom, when demand became more pressing, it might have been profitable to liquidate part of the securities portfolio. At the beginning of a recovery phase, by contrast, liquid assets were used first to reconstitute working balances with correspondent banks abroad, and only later to acquire securities; this is apparent from the results of co-spectral analysis of the series of interbank balances due by banks abroad and total security investments, and those of interbank balances due by banks abroad and total credits (tabulation above).

However, these conclusions need to be qualified somewhat in the light of the coherence and gain coefficients for the series in which the intervals between peaks coincide, or of the values of these coefficients corresponding to the peaks in each of the two series simultaneously submitted to spectral analysis.

Nearly all these coefficients do not assume significant values, which suggests the presence of forces extraneous to banking and susceptible of influencing the banks' management policies and especially their liquidity policies, making the latter more sensitive to medium- than to short-term cyclical variations.

Lorenzo Frediani

LA POLITIQUE DE LIQUIDITE DES BANQUES DE DEPOT AU KENYA

RESUME

Cet ouvrage a pour objet d'analyser les politiques de liquidité adoptées par les banques de dépôt opérant au Kenya. Dans ce but on a soumis à l'analyse

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spectrale les données obtenues en consolidant les bilans mensuels de chaque banque.

Les résultats obtenus nous permettent de déduire que les intermédiaires en question ont été plus sensibles aux variations cycliques de moyenne période qu'à celles de courte période. On estime que cette circonstance est due au manque d'efficience et à l'étroitesse du marché du crédit, au niveau et à la rigidité de structure des taux de rendement, aux caractéristiques du circuit des flux financiers engendrés par les banques et aux petites dimensions de la plupart de celles-ci.

Au-dessus de tous ces facteurs, on a pu vérifier l'incidence déterminante des obligations imposées à la gestion et aux politiques de liquidité des banques de dépôt du Kenya par les Autorités monétaires dans le but d'assurer la couverture des besoins financiers des agents économiques publics.

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