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## THE TARGETING OF OPEN MARKET OPERATIONS: THE BUNDESBANK EXPERIENCE AND LESSONS FOR NIGERIA

J.K.A. OLEKAH AND S.N. IBEABUCHI\*

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*The ultimate objective of the Bundesbank monetary policy actions is price stability. In fulfilling this objective the Bank targets money stock (M3) defined to include currency, sight, time and savings deposits. The intermediate target of M3 is interest rate in the money market which the Bundesbank seeks to control via the management of the supply of central bank money (cbm) to the credit institutions, (banks). How much of cbm is to be supplied or removed from the system depends on the desired demand, for currency by the non-bank public sector and the minimum required reserves by the credit institutions. Hence the Bundesbank forecasts the demand for cbm comprising of the currency and reserves components consistent with the agreed M3. The liquidity (cbm) needs of the credit institutions are carefully monitored during the year with the view to removing any financing gap that may constrain the attainment of the target M3. To this end the Bundesbank carefully manipulates both the long-term adjustment and fine-tuning instruments. The main adjustment instruments are the Lombard and Discount windows while the fine-tuning instruments include the Repurchase (Repo), quick tenders, foreign exchange swaps and deposit policy. The study has lots of lessons for Nigeria. It suggests that the CBN should review its OMO programming especially by identifying the major components of the other assets (net) of the CBN which often time distort the monitoring of the growth in money supply. The operating target (bank reserves) of OMO should be linked to the interest rate movement and the size of OMO for final sale should be decided after the bids have been received. Also the CBN should introduce its own instruments to complement the existing OMO instruments; the CBN's facilities to banks should be fully backed by acceptable collaterals; the minimum reserve requirement accounts should be de-sterilized and a more comprehensive procedure for OMO accounting should be adopted.*

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\* Mr. J.K.A. Olekah is an Assistant Director and Mr. S. N. Ibeabuchi is a Principal Economist both in the Research Department. This is a report of the study visit to the Bundesbank Germany from the 21st to 27th March 1994, following bilateral contacts between the Research Department CBN Lagos and the Bundesbank for a technical assistance in the targeting of Open Market Operations. We are very grateful to our host, the Bundesbank, for the valuable assistance and cooperation extended to us; especially Mrs. Clink, who effectively co-ordinated the study programme. We are also very grateful to the Management of the CBN in general and the Director of Research in particular for giving us the opportunity to benefit from the study. Nevertheless all views expressed here are neither that of the Bundesbank Germany nor of the Central Bank of Nigeria Lagos, but entirely that of the authors.

## INTRODUCTION

After about three years preparatory activities, the CBN conducted open market operations (OMO) for the first time on June 30, 1993. Since then, OMO has been conducted every week through the Discount Houses. Overtime, the need for country studies on OMO targeting became apparent as the operations of the market became increasingly complex. Consequently, arrangement was concluded with the Bundesbank which has long and useful experiences in open market operations, for a study visit on the forecasting of OMO target between 21st - 27th March 1994. The major objective of the study tour was to learn the techniques of OMO targeting in the Bundesbank; in addition, the study covered the strategy for determining the equilibrium money market interest rates.

The rest of this report is divided into five parts:

- (i) Monetary Targeting in Germany
- (ii) Liquidity Management
- (iii) Strategies for ensuring equilibrium money market rates
- (iv) The implication of the study for Nigeria
- (v) Concluding summary.

### 1. MONETARY TARGETING

The overall objective of open market operations in Germany is to ensure the attainment of a money stock (M3) target, compatible with long-term price stability. The ultimate objective of Bundesbank monetary policy is thus price stability, while the intermediate target of policy, is money stock (M3), broadly defined to include currency, sight, time and savings deposits held at credit institutions (banks). The choice of M3 as an intermediate target of policy, which began in 1988 is informed mainly by the long-time close empirical relationship existing between prices and M3. Furthermore, M3 has shown stable and positive correlation with the growth of nominal (overall) production potentials as well as a negative correlation with interest rate movements. M3 enjoys a high degree of stability in the German financial system and has not been seriously impeded by financial innovations owing to the efficient provision of virtually all financial services by the German universal banks, consequently minimizing the incidence of leakages in monetary policy implementation.

The Bank estimates the annual M3 (ex-ante) at the beginning of each year, as the growth of the real production potential plus an unavoidable rate of price rise(s) (nominal) and the change(s) in velocity of circulation of money. The forecast of the annual M3 is guided by the following equation: (see also the complete portfolio demand, interest rates and exchange rates model in the appendix).

$$1. \quad M3/W = M3(ZM, r, BSP/W)$$

where

- M3:** broad money stock  
**W:** Private financial wealth  
**ZM:** Monetary Asset yield  
**BSP:** Nominal GNP  
**r:** long-term Interest rate.

In order to capture exogenous influences on monetary development and short-term disruptions in the functioning of financial market as well as the difficulties of the statistical measurements of the money supply, the Bank since 1979<sup>1</sup> sets the monetary target in terms of corridor (range). The resulting monetary target is discussed and coordinated with the Federal Government. The Bundesbank has always been of the view that, it is of decisive importance for all concerned in the economic process to act in a way that is compatible with stability, such as, all expenditure units should adjust their income demands to the growth performance of the economy. Infringements of this requirement(s) mark out the limits to an effective monetary policy. If expenditure by the state, consumption wishes of households, capital expenditure and external demands on the national product together exceed the production potentials of the economy, adjustment crises with ensuing disruptions of price movements, employments and growth in the economy will sooner be inevitable. For this reason, the stance of monetary policy and its basic features as well as the strategy is explained to the trade union, the enterprises associations and the general public to help instill proper understanding of monetary policy actions.

For implementation and control purposes, the annual M3, is further projected into quarterly and monthly targets. The quarterly targets of M3, use the same explanatory variables as in equation 1, except that dummies are introduced to capture seasonal influences on the demand for money. The monthly targets of M3, are based on less quantitative techniques especially as the GNP figures are not available on monthly basis.

### Operating Target of M3

As in most developed financial environment, the market interest rates in Germany are of crucial importance to the expenditure decisions of investors and consumers. Changes in market interest rates have considerable effect on general propensities to invest/spend with implications for M3 and eventually economic activity. Thus the strategy of the Bank is to monitor movements in interest rates very closely. Since the German financial environment is basically market driven, the Bundesbank controls the interest rates indirectly through the supply of central bank money

1 The Bank briefly returned to a single figure forecast in 1989.

(cbm) defined to include currency in circulation (cic) and the minimum required reserves (mrr) which are held at the Bundesbank. The choice of cbm as an intermediate instrument of interest rate and M3, rest on the fact that cbm and M3, have identical definition and components. For instance, cic, a liability of the Bundesbank is a component of cbm and also of M3. The other component of cbm, the mrr, is derived as a positive function of the banks total deposit liabilities which is also a major component of M3. This implies that if the Bundesbank is not prepared to provide credit institutions with new cbm to feed cic and maintain growing mrr, money creation by banks would soon come to a standstill. The Bundesbank therefore works indirectly towards ensuring that the target M3 develops along the envisaged path by constantly reviewing the quantum and terms on which it makes cbm available.

### Optimal Demand For CBM

In order to provide cbm consistent with M3 target, the Bank, forecasts the optimal level of demand which must be equal to the supply of cbm. The estimation of optimal demand for cbm is guided by the following behavioural equation.

$$2. \text{ ZEBA} = (\text{BSRP}, \text{PSM3}/\text{PINV}, \text{GAP}).$$

where:

ZEBA = Provision of central bank money

BSRP = Aggregate supply at 1985 prices

PSM3 = Long-term price level

PINV = Price deflator of domestic demand

GAP = Utilization rate of production capacity(%).

The estimated annual levels are forecast into quarterly and monthly as well as weekly targets by incorporating dummy variables which capture the influence of seasonal factors. (see fig. 1). Indeed the daily forecast is intended to track weekly target, which in turn is expected to keep monthly estimates on course and eventually track the quarterly and annual targets, all things being equal. However, it is not unusual that in the normal money market operations, daily and weekly demand for and supply of cbm would deviate from target owing to some fortuitous factors. As a result, there are regular review of the Bundesbank's money market operation with the view to eliminating deviations from target observed in previous operations such that the overall average cbm supplied in any given year is not significantly different from the agreed target. Also most importantly, the Bank undertakes general review of the monetary policy measures every half-year. Experience however, indicates that the Bank rarely changes its targets; instead it reviews deviations from agreed target and tries to put in place measures capable of eliminating the deviations during the rest of the year. The only occasion when the Bundesbank had to change its policy targets in recent times, was in 1991

following the unification of the West and East Germany.

## **II. LIQUIDITY MANAGEMENT**

Liquidity management in Germany embraces largely the operations of the money market which are closely interlinked with the monetary policy of the Bundesbank. The money market involves mainly inter-bank dealings in central bank balances which affords the credit institutions the opportunity to make their excess cbm available to other banks thus ensuring horizontal liquidity adjustment within the banking system. Furthermore the money market enables liquidity bottlenecks and surplus positions foreseeable or expected in the future to be bridged, hence affording the Bundesbank, the opportunity to satisfy its short-term monetary policy goals.

### **II(a) The Supply of and Demand for Central Bank Money (cbm)**

The Bundesbank is the ultimate source of cbm, due essentially to the Bank's role as the sole issuer of currency. On daily and weekly basis, banks demand cbm for purposes of maintaining an appropriate minimum reserve positions and for meeting the currency demand of the non-bank public. Credit institutions in Germany are known to keep reserve balances at not more than the required minimum level especially as they do not attract any interest income unlike in some other Central Banks e.g. Bank of England in the U.K. The minimum requirement is calculated from the average of the credit institutions' liabilities subject to reserve requirement during the last two weeks of the preceding month and the first two weeks of the current month.<sup>2</sup>

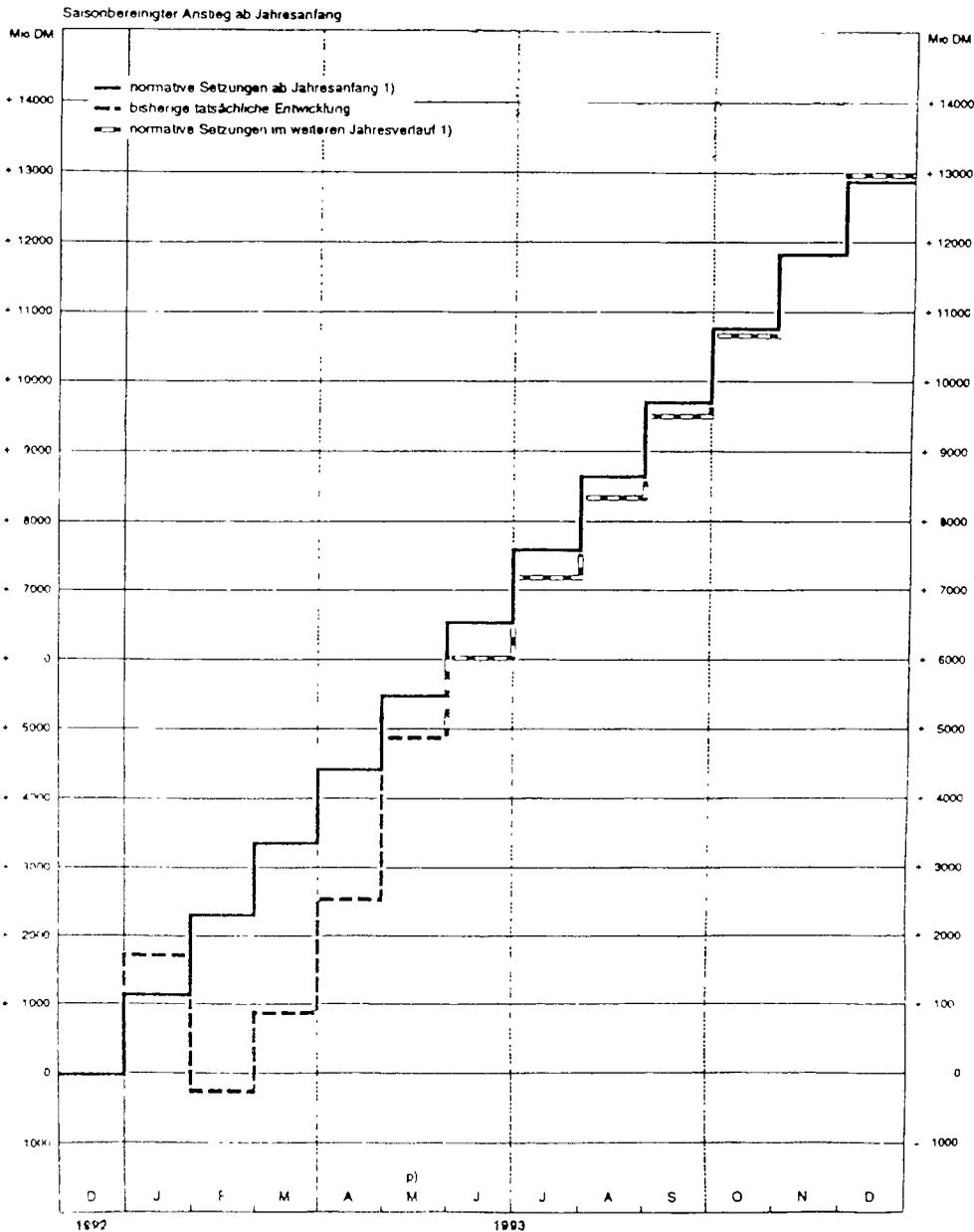
Thereafter a corridor (range), indicating an upper (a) and lower (b) limits as shown in fig 2 is constructed. The line c is the desired average. Since the minimum required balances are computed as the average of the specified deposit liabilities in the month, credit institutions may draw on their balances with the Bundesbank below the minimum required in between months, provided the average in the month is not less than the require minimum. It is therefore a common practice that towards the end months, banks endeavour to redress any foreseeable liquidity dis-equilibra by availing themselves of liquidity facilities in the Bundesbank.

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2 See Page 28 of the Deutsche Bundesbank: its monetary policy instruments and functions. 3rd Edition July 1989

Fig. 1

Zur Entwicklung des Zentralbankgeldbedarfs in 1993 \*)



\*) Monatsdurchschnittliche Werte - 1) Auf der Basis der jeweils letzten Projektion für ein zielgerichtetes Wachstum der Geldmenge M3 (Zuwachs 4% bis 6% vom vierten Quartal 1992 zum vierten Quartal 1993) - a) Geschätzt - b) Teilweise geschätzt - p) Vorläufig

## II(b). Instruments of Liquidity Management

There are a number of instruments through which the Bundesbank influences the supply of cbm. These instruments can be divided into long-run adjustment and fine-tuning measures, although the borderline is not distinctly clear. The liquidity policy instruments of longer-term adjustment are designed to meet the bank's need for cbm on a permanent or long-term basis, or to limit their liquidity scope. The main measures involved are changes in the minimum reserve ratios and the banks' re-financing facilities as well as definitive purchases or sales of long-term bonds by the Bundesbank in the open market. With respect to the interest rate policy, the setting of the discount and lombard rates provide a long-term bench mark for interest rates in the money and credit markets. The fine-tuning measures, on the other hand, are mainly used to neutralize temporary fluctuations in bank liquidity and steer the money market rates discreetly, in the desired direction. Fine-tuning measures include open market operations in the widest sense with maturities of between less than one week and one to two months. Examples are day-to-day shifts of public funds to the banking system, sales of short-term Treasury bills, transactions under repurchase agreements in bonds, in trade bills, foreign exchange swap and repurchase transactions. The open market operations are highly flexible as they can be used almost entirely at the discretion of the Bundesbank. However recourse by banks to utilized rediscount facilities and lombard loan is generally on the initiative of the banks themselves.

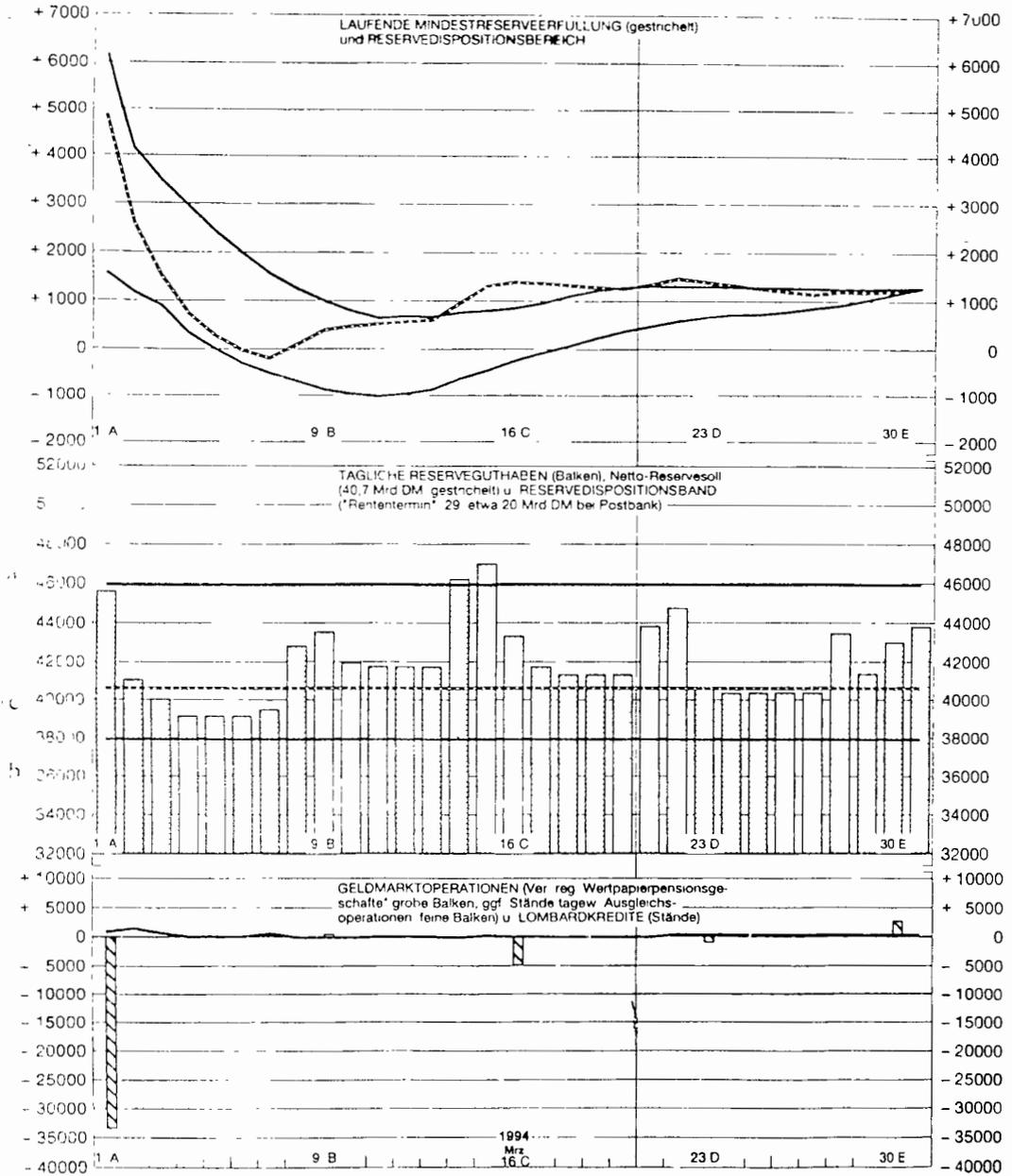
The lombard loan is the most expensive of the Bundesbank facility because of its high interest rates, consequently, banks use this facility only as a measure of last resort. The rediscount window on the other hand, carries the lowest rate in the

market but banks are not permitted to borrow more than their respective quota. On the whole, the most popular source of facility is the Repo which is provided through the weekly open market operations (OMO). (see fig. 3) The interest rates on Repo are market determined and relatively moderate when compared to the lombard rates, though higher than the Rediscount window rates. However, because the Repo facility via OMO is available only once a week, it does not completely smooth out the daily fluctuations in interest rates/resource gap. Thus, as mentioned earlier, in order to avoid excessive daily fluctuations in interest rate, the Bank's repurchase operations are supplemented by a number of other reversible fine-tuning measures. These include the sale of short-term treasury bills, open market operations under foreign exchange swap or repurchase agreements, and the shifts of public authorities deposits to the credit institutions. Credit institutions also trade among themselves for cbm as the deficit units seek to buy cbm from the surplus units.

Fig. 2  
Vo 1-2

**Vo 1-2**  
**ZUR LIQUIDITÄTSLAGE DER BANKEN IM MÄRZ 1994**  
(Mio DM)

SCHÄTZZEITRAUM: rechts von der senkrechten Linie



\* (Reguläre) WERTPAPIERPENSIONSGESCHÄFTE (An- auf/Verfall in Mrd DM): A (+ 72 0/-105 4), B (+ 83 0/- 82 5), C (+ 67,1/- 72 0) D (+ 82 0/- 83 0) E (+ 69 7/- 67,1)

**Fig. 3**  
**Structure of bank re-financing with the Bundesbank<sup>3</sup>**

**Percentage shares in total refinancing (based on average amounts outstanding during period)**

	Discount credit under rediscount and refinancing quotas	Recourse to special quotas for money market paper eligible for purchase by the Bundesbank	Security-based repurchase agreements	Lombard or special lombard loans
1980	74.6	8.9	6.0	10.5
1981	77.5	9.1	6.9	6.5
1982	69.6	10.3	14.8	5.3
1983	73.4	10.5	8.0	8.1
1984	67.4	9.1	15.9	7.6
1985	57.8	6.2	34.7	1.3
1986	60.8	5.4	33.2	0.6
1987	61.7	5.0	33.0	0.3
1988	47.8	3.8	47.7	0.7
1989	35.6	3.4	59.9	1.1
1990	39.3	2.9	56.3	1.5
1991	36.5	1.4	61.1	1.0
1992	33.1	0.9	65.4	0.6
1993	27.0	0.7	71.8	0.5

### II(c). Optimal Supply of Central Bank Money (cbm)

The Bundesbank at all times seeks to supply cbm adjudged to be consistent with the annual M3 target. How much of central bank money (cbm) is supplied or removed from the system depends on the deviation of the actual cbm from agreed optima as computed from equation 2<sup>4</sup>. The cbm is the liability of the Bundesbank and is obtainable from the Bank's balance sheet (see fig. 4).

3 Excluding open market transactions in trade bills under repurchase agreements, Foreign exchange swaps, shifts of Federal Funds under section 17 of the Bundesbank Act and quick tenders.

4 For monthly, weekly and daily cbm target, the result obtained from equation 2 is discretionally adjusted to reflect or capture non-quantitative factors.

**Fig. 4**  
**A SIMPLIFIED WEEKLY RETURN OF THE BUNDESBANK**  
**STATEMENT OF ASSETS AND LIABILITIES**

<b>ASSETS</b>	<b>LIABILITIES</b>
Net monetary reserves (NMR)	Currency in circulation (CC)
Bills of exchange (BE)	Deposits of Banks (DB)
Lombard Loans (LL)	Net Deposits of Public authorities (NDP)
Open market operations (OMO)	Other Liabilities (OL)
Other assets (OA)	

The information content of the Bundesbank balance sheet derives primarily from the liquidity policy relations of the Bank with the credit institutions. Thus the Bank's balance sheet is so arranged that the Bundesbank's liabilities that constitute the cbm are equated to other variables.

$$3. \quad \text{cbm} = \text{CC} + \text{DB} = \text{NMR} + \text{BE} + \text{LL} + \text{OMO} + \text{OA} - \text{OL} - \text{NDP}$$

However actual cbm (daily) levels are available with a lag of one day hence for purposes of maintaining effective management of cbm, the Bank forecasts the perceived cbm by examining and analysing the balance sheet of the Bundesbank. The historical levels of the Bank balance sheet in the recent several months, weeks and days are analysed and used to forecast the perceived cbm on daily basis for a period of one month. The forecast values are revised as firm figures are obtained. Thereafter the forecast (cbm) is compared with target, to obtain the deviation from target

#### **II(d). Target of OMO**

However to arrive at the OMO target, the deviation from target is further reviewed by taking cognisance of all other factors that influence Bundesbank's supply of reserves to the system, such as:

- (a) Lombard loans
- (b) Rediscount window facility
- (c) Government deposit released into the system
- (d) Intervention in foreign exchange market (swaps)
- (e) Other short-dated monetary paper of the Bundesbank
- (f) Maturing repo;

This means that the optimal OMO for the market is adjusted, by ensuring proper accounting of the OMO which takes into consideration the net positions of the above instruments as follows:

$$4. \text{ OMO} = \text{CC} + \text{DB} - \text{NMR} - \text{BE} - \text{LL} - \text{OA} + \text{OL} + \text{NDP}.$$

### II(e). OMO and Repo

Open market transactions under repurchase agreements have acquired increasing importance. Since 1979, the Bank has purchased from credit institutions which have to hold minimum reserves, fixed interest securities that are eligible as collateral for lombard loan on condition that they sell/buy the securities back/forward at the same time. The securities have to be officially listed on a stock exchange such as Bonds of the Federal Government, the Federal Railways, the Federal Post Office and Treasury discount paper of these official issuers with a remaining period to maturity of up to one year. In fact, all facilities from the Bank to credit institutions must be fully backed by acceptable collateral, hence to qualify for Bundesbank facility, credit institutions should have sufficient securities of any of the above instruments in the common 'pool' in the Bank. For this reason credit institutions lodge with the Bundesbank their holdings of instruments that qualify for eligibility for loans. The lodgment constitutes a liability on the Bank's balance sheet. Consequently, any facility from the Bank to credit institutions reduces its indebtedness as a corresponding credit item is created on the assets side of the balance sheet. However the entries are reversed when loans/facilities are redeemed.

The OMO in repo is conducted every week for a maturity period of two weeks. The Bundesbank conducts the OMO directly with credit institutions so as to give each institution direct access to the Bank's credit facilities. This is unlike in the Bank of England and the Federal Reserve System of the U.S where OMO is conducted via Discount Houses and Principal Dealers, respectively.

### II(f) INFORMATION GATHERING

In order to maintain a reliable system of information gathering and dissemination, the Bundesbank, in addition to its Head office in Frankfurt uses its Land Central Bank (9 in number) each with a network of branch offices located in the cities and towns to gather and distribute information. For example, the head office in Frankfurt announces the weekly Repo for the OMO via the Reuters and its Land Central Banks on the morning of every Tuesday. By the close of 3.00 p.m. on Tuesday, credit institutions submit bids to the Land Central Bank which in turn collates the bids and forward same to the head office in Frankfurt. The head office collates all the bids from the entire Federation and arranges the bids in a descending order of bid rates. By the morning of Wednesday a day after the notice of the market has been given, the Bank Directorate meets at about 10. a.m. in Frankfurt over the collated bids (see fig. 5) to decide on the final amount of Repo for OMO. This is to say, that the amount of reserves provided under Repo is

ultimately decided at the Bundesbank discretion irrespective of the notice given for the market and this is done usually after bids have been received and assembled.

## **II(g). Influence of Policy Making Bodies on OMO**

There are two main policy making bodies viz the Central Bank Council and the Bundesbank Directorate, whose decisions influence the size of OMO. The Central Bank Council is the supreme policy making body. It meets bi-weekly on Thursday, to review the general trends in monetary and credit developments in order to decide on the stance of liquidity measures for the weeks ahead. Specifically, it considers the stand of OMO for the next two weeks and its decisions are usually qualitative in nature, such as what method of Repo should be employed (volume or interest rate tender). Usually when the liquidity of the financial environment is not very certain the Bank may prefer the use of volume tender which permits credit institutions to decide on the size of the issues at rate fixed by the Bank. The next body is the Bundesbank Directorate. It meets every Wednesday at 10.a.m. to implement the broad decisions of the Council. Its actions are very quantitative such as deciding on how much or value of the Repo that should be sold; and at what price. Indeed, irrespective of the type of tender, the Directorate has the ultimate discretion to decide on the size of Repo as well as the interest rate. The Directorate's decisions are based mainly on collated information from the repo tender. Fig. 5 is a sample of some of the information forwarded to the Directorate meeting. The total value of OMO expected is DM 76.0 billion. The method of tender is interest rate tender. Allocation of OMO is by the US style, thus bids above the standard allotment rate receive full allotment. The marginal bid lies between D.M. 75.987 billion and DM 92.065 billion. Additional information is provided beyond the marginal bids to assist the Directorate in making decision. For instance, bids beyond the marginal bids have implications for interest rates. If the Directorate considers tightening liquidity, it may decide to settle at bids before the DM 76.0 billion; alternatively if it decides to ease liquidity, then the bid rates would need to be lowered by selecting a bid after the initial marginal bid.

## **II(h). Types of Repurchase Agreements**

There are two types of repurchase agreement - repurchase agreement by interest rate tender and repurchase agreement by volume tender. For a volume tender, the Bundesbank does not announce the volume but sets the rate of interest while banks are asked to bid for the amount of securities that they wish to obtain at the specified rate of interest. Funds are allocated to individual banks or institutions on the basis of a uniform allocation ratio, (Dutch style) with each individual bank's bid being reduced in proportion to the overall purchase/bid ratio.

For an interest rate tender, the banks are requested to submit bids containing both the amount of securities and the repurchase rate. Unlike the volume tender, the Bank, announces the value of securities it intends to offer. The allocation of funds is presently made on the basis of the different repurchase rates bid of the credit

**Fig. 5**  
**Wertpapierpensionsgeschäfte**

Ausschreibung vom:	23.03.94
Verfall:	07.04.94
Laufzeit (Tage):	14

Zur Erinnerung:	Letzte in %
Zuteilungssätze:	5,88–6,00
Schwerpunktsätze	5,89–5,90
Rapartierungssatz:	15%
heutiger Verfall:	83,0 Mrd DM

Gehalts- % p.a.	Beträge (Mio DM)	
	zum jeweiligen p.a. - Satz	kumuliert
6,00		
5,99		
5,98		
5,97		
5,96		
5,95	3	3
5,94		3
5,93		3
5,92	10	13
5,91		13
5,90	303	316
5,89	41	357
5,88	568	925
5,87	2.543	3.468
5,86	2.453	5.921
5,85	9.585	15.506
5,84	12.211	27.717
5,83	18.568	46.285
5,82	19.223	65.508
5,81	10.479	75.987
5,80	16.078	92.065
5,79	2.260	94.325
5,78	3.416	97.741
5,77	2.217	99.958
5,76	795	100.753
5,75	6.469	107.222
5,74		107.316
5,73		107.316
5,72		107.316
5,71	2.129	109.445
5,70	10	109.445
5,69	40	109.445
5,68		109.445
5,68		109.445
5,65	35	109.530
5,64		109.530
5,63		109.530
5,62		109.530
5,61		109.530
5,60	26	109.556
5,59		109.556
5,58	5	109.561
insegesamt*)	109.561	

Zuteilungsmöglichkeiten			
Variante	p.a.-Sätze	Zuteilungsquote zum marginalen Satz	Betrag (Mrd DM)
1	5,81 – 5,95	100,0%	76,0
2			
3	5,80 – 5,95	8,0%	77,3
4		15,0%	78,4
5		20,0%	79,2
6		25,0%	80,0
7		30,0%	80,8
8		35,0%	81,6
9		38,0%	82,1
10		45,0%	83,2
11		50,0%	84,0
12		55,0%	84,8
13		60,0%	85,6
14		70,0%	87,2
15		75,0%	88,0

institutions (U.S Style).

### III. ACHIEVING EQUILIBRIUM INTEREST RATE IN THE MONEY MARKET

Backed by its key position in the supply of cbm, the Bundesbank uses the instruments at its disposal to structure interest rates and supply and demand conditions in the money market in line with its monetary objectives. As earlier indicated there are two broad instruments viz, instruments for longer-run adjustments and instruments for fine tuning, (see Fig. 6). Under the longer-run adjustment, are the lombard and discount rates, the fine tuning rates are the treasury bill selling rates and repurchase rates. Fig.7 reveals that in the structure of rates, the lombard is the highest while the discount is the floor. All other rates fall in between the two except in very rare occasions.

The strategy for seeking to achieve an equilibrium rate is very complex. However, it could be simplified as follows: Firstly, the Bank changes its own interest rates for re-financing transactions and open market operations. Secondly it chooses what appear to be the best channel through which to provide or withdraw central bank money; and finally the Bank decides on the timing of interventions in the money market and the appropriate period to make liquidity available on the market.

Indeed through its management of liquidity in the money market, the Bundesbank exerts direct impact on interest rates. On a longer term, the Bank influences the willingness of banks to lend and the demand for money and credit in the economy in the desired direction through the transmission channels. The result is that monetary expansion takes place at a pace compatible with the desired monetary target and money market rates.

### IV. IMPLICATIONS OF THE STUDY FOR NIGERIA

The German experience in OMO has relevant lesson(s) for Nigeria's quest for an efficient framework for targeting OMO.

#### Targeting OMO

- (1) As in the Central Bank of Nigeria, the framework for forecasting the target for OMO in the Bundesbank is based on the analysis of the central bank balance sheet. However, unlike in Nigeria, the other assets (net) of the Bundesbank, one of the determinants of central bank money, constitute an insignificant proportion of total liabilities/assets of the Bank whereas in Nigeria, the other assets (net) of the CBN constitute a substantial portion of the total monetary assets. The main implication of having a negligible other assets (net) in the Bundesbank is that the determinants of central bank money and OMO target are reduced to a number of variables which the Bank can effectively control. On the other hand, when other assets(net) is considerably large and significant as in the case of CBN, it becomes difficult and almost impossible to effectively influence the determinants of OMO through the use of the instruments under the authorities

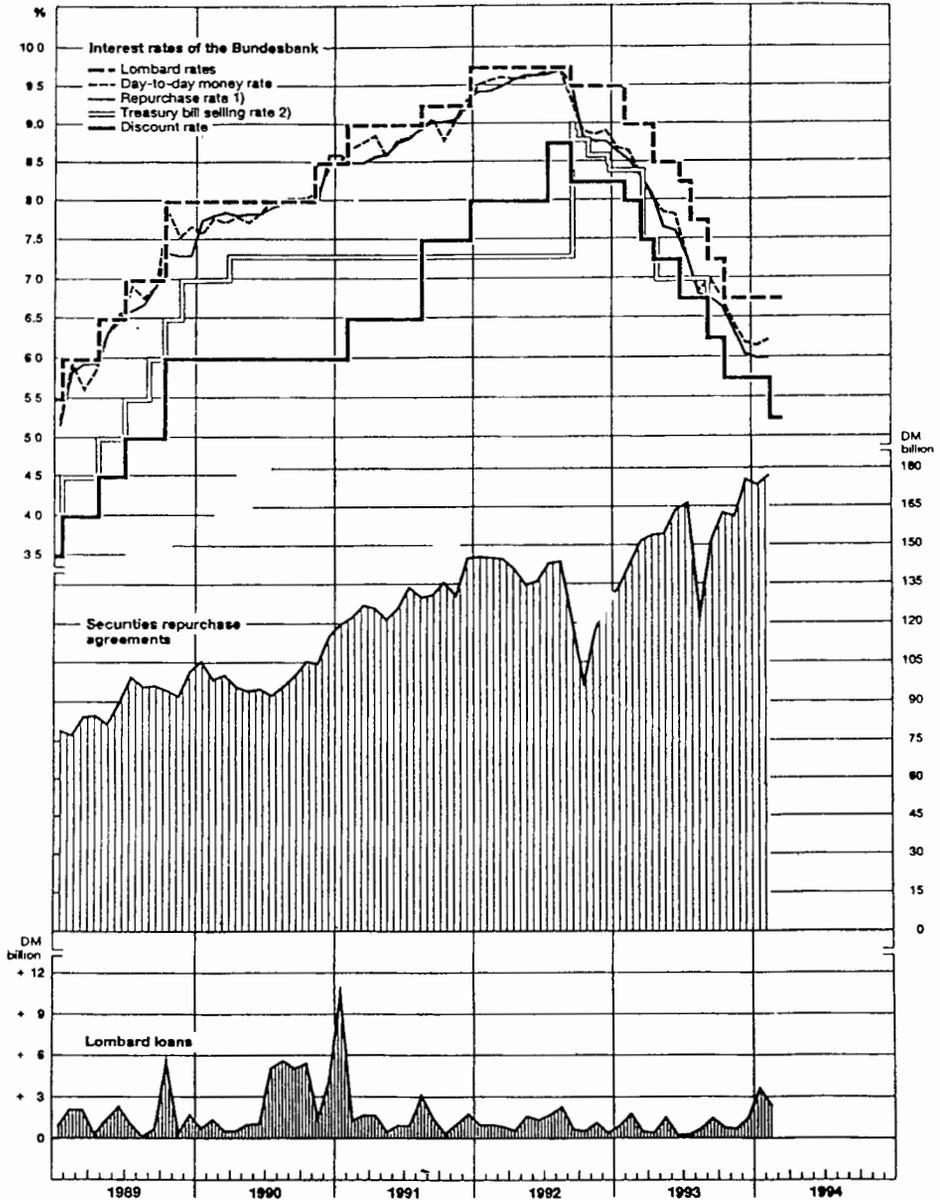
**Fig. 6**  
**Instruments of monetary policy in Germany**

<p><b>I. Longer-run adjustments</b></p> <p>a) Interest-rate policy Discount rate Lombard rate</p> <p>b) Bank-liquidity management Minimum reserves</p> <p>Rediscount quotas/ lombard ceilings</p> <p>Outright operations in long-term bonds</p> <p>Issue and premature redemption of Bundesbank "liquidity paper"</p>	<p><b>II. Fine-tuning measures</b></p> <p>Treasury bill selling rate 1 Repurchase rates 2</p> <p>Bill-based repurchase agreements</p> <p>Foreign exchange swaps and repurchase agreements Quick tenders Deposit policy 3</p> <p>Security-based repurchase agreements 4</p>
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1. Selling rates set for bill-type Bundesbank "liquidity paper" (under section 42 respectively of Bundesbank Act) act as a floor for the call money rate.
  2. Allotment rates of security-based repurchase agreements influence the determination of short-term money market rates (especially through expectations).-
  3. Redepositing of Federal government cash balances held with the Bundesbank in the money market (according to section 17 of the Bundesbank Act).-
  4. Repurchase agreements in fixed-interest securities are used for "fine-tuning" banks' reserve position during calendar months and for satisfying banks' long-run re-financing needs on a "roll-over" basis.

Fig.7

Operating variables in the money market



1) Average monthly interest rate for securities repurchase transactions with one-month or with two-weeks maturities; uniform allotment rate (fixed-rate tenders, "Dutch" variable-rate tenders) or weighted allotment rate ("US-style" variable tenders) - without quick tender.- 2) Normally with three-days maturities.

control. Hence in order to ensure an efficient targeting of OMO, the CBN should review its balance sheet items for OMO programming especially by seeking to identify the major factors responsible for the erratic movements in other assets (net)

2. The operating target (central bank money) of the Bundesbank policy is inversely related to interest rate while in the case of CBN, the operating target of policy (reserves) is not necessarily linked to interest rates owing largely to the long period of interest rate repression. The established link between money and reserves in the CBN is via the monetary base. In view of the on-going deregulation of the financial sector in Nigeria and the obvious theoretical link between interest rates and prices (an ultimate objective of CBN policy), interest rates should be the most appropriate indicator of liquidity management. To this end it is necessary that the operating target of policy (reserves) should, as soon as practicable be determined in relation to agreed interest rate policy. Consequently, there is urgent need for thorough studies in money, reserves and interest rates relationships in order to provide guidance to policy making and implementation. In addition, there is need to construct yield curves in order to guide transactions in the secondary market.

### Size of OMO

3. The Economic Department of the Bundesbank has the primary responsibility for forecasting the OMO target and forwarding same to the Credit Department of the Bank for implementation. Similarly, in the CBN, the Research Department is responsible for forecasting the OMO target and forwarding the result to the Banking Operations Department. As earlier stated, the amount of OMO sold is finally determined by the Bundesbank Directorate after OMO bids have been received and collated. In the case of the CBN, there has been less flexibility in deciding exact level of OMO as sales have more often than not been restricted to pre-announced targets even when actual market outcome could indicate otherwise. The issue of deciding on the actual level of OMO for the market after bids must have been received has one major advantage. In particular, it gives the authorities the opportunity of correcting any forecasting error associated with the OMO projections especially as OMO is influenced by both market fundamentals and technical factors which are not easily captured simultaneously with short-term forecasting models. While short-term models are most able to track technical factors, the market fundamentals manifest itself sufficiently well only in the relatively long term. The CBN should adopt the method of deciding on the final OMO sales only after the bids must have been received.<sup>5</sup> To this ends, a high level committee consisting of five members drawn from the present OMOC and MPCC should be constituted and charged

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5 The IMF study team, on Improvement of OMO in Nigeria, had earlier recommended that the Bank need not announce the volume of OMO until it has received the bids.

with the responsibility for deciding on the final level of OMO sales. The modalities of operations for this committee could be worked out later.

### **Use of CBN Instruments for OMO**

4. In Germany, OMO is conducted through Bundesbank's instruments; as a result the Bank has sufficient leverage in terms of pricing, timing and size of issues. In the CBN, OMO is presently conducted through treasury securities which the Bank has limited control. For instance, because the market is operated through government securities, OMO denominated treasury securities which have relatively short period to maturity can not be allowed to sell at rates higher than rates on similar instruments in the primary market with relatively long tenure. Also because the amount of OMO securities for the market is dependent on treasury bills outstanding, the CBN has had to sell less than the market demands owing to lack of bills of desired tenure. Moreover, since the partial re-regulation of the economy at the beginning of 1994, there has been dwindling response in OMO from prospective participants largely because the treasury bills rates are no longer market determined. The re-activation of banks' interest in OMO is very crucial for effective liquidity management and this can be achieved only when the Bank uses its own instruments which would allow it the freedom to change the size of OMO securities, influence the pricing and timing of issues in accordance with developments in the market.

### **Use of more short-tenured securities**

5. Instruments of short-tenure reduce the risk associated with the long waiting time that goes with instruments of relatively long maturity. In the Bundesbank, the maturity of the OMO instruments (repurchase agreement) was initially about 63 days, but presently the security tenure is not more than 14 days, suggesting that over time the system has found short-tenured securities relatively most appropriate for liquidity management. For this reason, the type of CBN own securities for OMO under suggestion should be of very short tenure. The CBN presently conducts Repo sales/purchases in treasury bills, with the discount houses on limited basis and for very short periods. It may be necessary, to consider on a fairly extensive scale, repo sale/purchases in CBN instruments for a maturity period of about 14 days. To this end, the experience of the Bundesbank in Repo market would be highly relevant which the Research and Banking Operations Departments in the CBN could benefit from.

### **CBN facilities to banks**

6. Financial facilities from the Bundesbank to credit institutions are fully backed by collaterals as institutions seeking to benefit from the Bank's credit must have sufficient eligible securities including treasury securities. Indeed the Bundesbank is by law precluded from granting any form of credit to the Federal Government; hence the public sector re-financing requirement are

sourced outside the Bundesbank, mainly from the money and capital market. To induce the credit institutions to finance the federal government, the Bundesbank makes holdings of treasury securities and other eligible instruments, a precondition for the Bank's credit. Consequently, to ensure eligibility for Bundesbank facility, credit institutions invest their idle reserves in eligible securities and keep same in a 'general pool' with the Bank. Whenever the Bank extends financial accommodation to any of the institutions, it simply debits the credit institutions general pool accounts and credits the Bank's credit facility accounts. At the moment credit facilities from the CBN to the banking system is not fully backed by collaterals (securities). It would be beneficial to the banking system if CBN credit to banks are fully backed by collaterals as in Germany. The CBN should desist from financing government deficits but should give enough inducement to banks to do so in order to minimize the level of inflationary financing in the system.

### De-sterilization of the Reserve Requirements Accounts

7. A major factor contributing to the high incidence of bank's over-drawn accounts with the CBN, is the sterilization of the required reserve accounts in the Bank.<sup>6</sup> Presently, the reserve requirement of the banks are kept in a separate account in the CBN, without any interest paid on them, yet banks are not allowed access to such deposits.<sup>7</sup> As in Germany, banks in Nigeria are subject to minimum reserve requirements which must be observed on average basis. Unlike in Nigeria, the required reserve deposits of the credit institutions in the Bundesbank are not sterilised neither are they kept in a separate account. Instead the minimum reserves and excess reserve deposits are kept in a single general account and banks are free to draw on the general account provided the average level during the maintenance period is not less than the required minimum. It could be reasoned that if idle reserves in the sterilized accounts is allowed to flow freely to banks to cushion temporary liquidity shortfalls, the incidence of overdrawn position with the CBN by banks could be minimized all things being equal. The Central Bank of Nigeria, should therefore reconsider allowing banks to draw on the reserve accounts provided the average level during the maintenance period does not fall below the agreed minimum.

### Lender of last resort

8. The CBN should design an effective and relatively comprehensive policy of its facilities to banks, such that recourse to the Bank would only be used on a lender of last resort basis. For instance, re-financing facility to banks should be

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6 A similar view was expressed by the IMF mission in March 1994, during their study on improvement of Open Market Operations in Nigeria.

7 In the Bank of England, even though the Bank does not specify minimum reserve requirement, banks are paid interest for depositing with the Bank of England.

on quota as in the Bundesbank while direct loans should carry a panel rate. Nevertheless, all facilities should be fully backed by acceptable collaterals as discussed earlier on.

### **Data Gathering and Analysis**

9. The Bundesbank invests adequately on data gathering and analysis; largely for this reason the Bank has made tremendous success in the conduct of OMO even without the use of discount houses and principal dealers. The Bundesbank utilises its Land Central Bank which has a number of branch offices in the major cities and towns, to collect the required information. Presently, the CBN has State branches and Zonal Offices as well as Currency Centres in all the state capitals of the federation and it is necessary that these state branches and zonal offices should be optimally utilized in gathering the relevant data on OMO and other useful information than presently the case. As at now, the forecast of OMO target is based largely on Lagos Head Office's trial balances as the state branch returns are not readily available. The state branches of the CBN and the zonal offices could be used to gather the relevant information on OMO from outside the head office (Lagos) provided the operational arrangement is efficiently designed to ensure effective use of human and financial resources.
10. Desk officers involved in OMO forecasting and compilation in the Bundesbank are continually reviewing and revising the OMO data as new information is received. In the same way, the desk officer responsible for forecasting OMO target in the CBN should also be seen to review its estimates regularly while the trading desk re-calculates the CBN net re-financing facility to banks as frequently as practicable. Finally the CBN should adopt a more comprehensive method of accounting for OMO activities so as to ensure efficient targeting of the intermediate instrument of money. To this end, some practices in the Bundesbank that are relevant to our own environment would be of great lesson(s) to the CBN.

### **V. CONCLUDING SUMMARY**

The framework for targeting OMO in the Bundesbank begins with the determination of a target M3 which is, forecast on the assumptions of the growth in the production potentials, rise in price and the change in velocity of money in circulation. Next is to obtain the intermediate target of M3, 'interest rate', in the money market which is controlled through an operating instrument, the central bank money, comprising of the minimum required reserves and currency in circulation. The strategy for arriving at the desired money market interest rate involves very pragmatic techniques. The Bundesbank so to speak feels its way by the flexible use of fine-tuning instruments so as to achieve longer-term adjustments. The Bank decides on individual measures designed to create the desired conditions in the money market by establishing suitable short-term

operational for bank liquidity (central bank money) and money market rates which are in line with the longer term objective of policy. During the year, the Bank continuously examines when and if necessary to what extent deviations from assumed short-term target path should be corrected through adjustment of the conditions in the money market.

A number of instruments are manipulated by the Bank in attempt(s) to achieve equilibrium in the money market. These include the Lombard loan; rediscount window facility, release of government deposit with the central bank to the credit institutions; intervention in foreign exchange market, repurchase agreement (OMO) and other short-dated monetary paper of the Bundesbank. These instruments can be divided into longer-run adjustment designed to meet the banks' need on a permanent basis while the fine-tuning measures are used to neutralize temporary fluctuations in bank liquidity.

The experiences of the Bundesbank operations have relevant messages for Nigeria's quest for an efficient framework for targeting OMO. In this regards, the CBN needs to review the components of other assets (net) in the Bank's balance sheet in order to ensure that the Authority exercises effective control on factors influencing the target of OMO. The operating target (bank reserves) should be linked to interest rates movement; the size of OMO for final sale should be decided after the bids have been received and the CBN should design more short-tenured securities as well as introduce its own instruments for OMO. All facilities from the CBN to banks should be fully backed by acceptable collaterals; de-sterilize the reserve requirement accounts so as to make idle reserves accessible to banks in order to reduce the incidence of large over-drawn positions with the Bank. Finally OMO data gathering and analysis in the CBN should be improved by involving the State and Zonal branches of the CBN in the collection and dissemination of OMO information while the Bank should adopt a more comprehensive accounting technique for OMO.

## APPENDIX

### Stylized version of the Bundesbank model

A	Aggregate demand		
(1)	Private consumption	$C/P$	$= C((YV/p)/P, (NVII/p)/P, z, -pe)$
(2)	Labour supply	$I/P$	$= E(PE/P, H^w (1-u)/p, (Q^* (1-u) + TR)/p)$
(3)	Real final demand	$Y$	$= C + I + G/p + X$
(4)	Real GNP	$BSR$	$= Y - IM$
(5)	Nominal GNP	$BSP$	$= Y^* p - IM^* m$
(6)	Profits	$Q$	$= BSP - w^* \Lambda - d^* p^* K - TI$
(7)	Disposable income	$YV$	$= \Lambda^* w + Q + TR - TD$
(8)	Savings of households	$III$	$= YV - C^* p$

<b>B Aggregate supply</b>		
(9) Real investment	I	$= I(c/p) \cdot (1-t), Y$
(10) Labour demand	A	$= II(w/p) \cdot (1-t), Y$
(11) Working hours	II	$= (f, v, N, \text{GAP})$
(12) Real imports	IM	$= IM(m/p) \cdot (1-t), Y$
(13) Production potential	BSRP	$= BSRP(E, N, K(-1))$
(14) Capacity utilization	GAP	$= BSR, \text{BSRP}$
(15) Real capital stock	K	$= (1-d) \cdot K(-1) + I$
(16) Financial balance of firms	Fu	$= p \cdot I - d \cdot p \cdot K$
(17) Employment	B	$= A/II$
(18) Unemployment rate	ALQ	$= (E - B)/E$
<b>C Factor costs and price deflators</b>		
(19) Normal wage rate	v	$= v(p, N, \text{ALQ} - \text{ALQN})$
(20) Effective wage rate	w	$= v \cdot (H/N) \cdot g + f/II$
(21) Price defl. of final demand	p	$= p(k/(1-t), \text{GAP}, \text{PSM3}/p)$
(22) Expected prices	pe	$= pe(p(-1), p(-2), \dots)$
(23) User cost of capital	c	$= p \cdot (r - pe + d) \cdot (1 - u \cdot d/(r + d)) / (1 - u)$
(24) Production costs	k	$= k(w, c, m)$
<b>D Distribution of income</b>		
(25) Direct taxes	TD	$= u \cdot (w \cdot A + Q)$
(26) Indirect taxes	TI	$= t \cdot p \cdot Y$
(27) Transfer payments	TR	$= \text{TRA}(\text{ALQ}, w \cdot (1-u) \cdot II) \cdot (E - B) + \text{TRB} = (w \cdot II) \cdot \text{PR} + \text{TRS}$
(28) Government budget	FS	$= \text{TI} + \text{TD} - G - \text{TR}$
<b>E Foreign trade and payments</b>		
(29) Real exports	X	$= X(e \cdot p/pf, Yf)$
(30) Price deflator of imports	m	$= m(pf/e)$
(31) Trade balance	LBS	$= X \cdot p - \text{IM} \cdot m$
<b>F Portfolio demand</b>		
(32) Currency	BU/M3	$= BU(zm, \text{BSP}/M3)$
(33) Deposits	DP/M3	$= DP(re, zm, \text{BSP}/M3)$
(34) Other financial assets	GK/W	$= GK(zm, r, \text{BSP}/W)$
(35) Money stock	M3/W	$= M3(zm, r, \text{BSP}/W)$
(36) Net wealth of households	NVII	$= \text{NVII}(-1) + \text{FII}$
(37) Net wealth of firms	NVU	$= \text{NVU}(-1) + \text{FU}$
(38) Portfolio of private sector	W	$= \text{NVII} + \text{NVU} + \text{KP}$
(39) Minimum required reserves	MS	$= ms \cdot M3$
(40) Excess central bank money	FZ	$= ZA + ZK - BU - MS$
(41) Long-term price level	PSM3	$= M3 / \text{BSRP} \cdot b$
<b>G Interest rates and exchange rates</b>		
(42) Money market interest rate	rd	$= rd(rz, rdf, p, FZ)$
(43) Deposit rate	re	$= re((1 - ms) \cdot rd)$
(44) Long-term interest rate	r	$= r(rd)$
(45) Exchange rate	e	$= e(rdf - rd, pf/p)$
(46) Monetary asset yield	zm	$= re \cdot (1 - \text{BU}/M3)$
(47) Portfolio yield	z	$= zm \cdot \text{M3}/W + r \cdot (1 - \text{M3}/W)$

## H. Variables

Notation in the stylized version differs from notation in the complete model. Some of the exogenous variables in the stylized version are endogenous in the complete model.

A	Total hours worked	
ALQ	Unemployment rate	
ALQN	Normal unemployment rate	Exogenous
B	Employed persons	
BSP	Normal GNP	
BSR	Real GNP	
BSRP	Potential real GNP	
BU	Currency	
C	Real private consumption	
c	User costs of capital	
DP	Deposits	
E	Labour force	
e	Exchange rate	
f	Fixed labour costs	Exogenous
FH	Savings of private households	
FS	Government budget	
FU	Surplus or deficit firms	
FZ	Excess central bank money	
G	Nominal government expenditure	Exogenous
GAP	Capacity utilization	
GK	Other financial assets	
H	Effective working hours	
I	Real investment	
IM	Real imports	
K	Real capital stock	
k	Production costs	
KP	Bank credits	Exogenous
LBS	Trade balance	
m	Price delator of imports	
m3	Money stock	
MS	Minimum required services	
ms	Minimum required reserve ratio	Exogenous
N	Normal working hours	Exogenous
NVH	Net wealth of private households	
NVU	Net wealth of firms	
P	Population	
p	Price deflator of final demand	
PE	Population, aged 15 to 65 years	Exogenous
pe	Expected deflator of final demand	
pf	Foreign prices	Exogenous
PR	Population, aged over 65 years	Exogenous
PSM3	Long-term price level	
Q	Profits	
r	Long-term interest rate	
rd	Money market interest rate	
rdf	Foreign money market interest rate	Exogenous
re	Deposit rate	
rz	Central bank interest rate	Exogenous

t	Indirect tax rate	Exogenous
TD	Direct taxes	
TI	Indirect taxes	
TR	Total transfer payments	
TRA	Unemployment benefits	
TRB	Pensions	
TRS	Residual transfer payments	Exogenous
u	Direct tax rate	Exogenous
v	Normal wage rate	
W	Private financial wealth	
w	Effective hourly wage rate	
X	Real exports	
Y	Real final demand	
Yf	Foreign real final demand	Exogenous
YV	Disposable income	
z	Average yield on private portfolio	
zm	Monetary asset yield	
ZA	Foreign reserves of central bank	Exogenous
ZK	Domestic assets of central bank	Exogenous
<b>I. Parameters</b>		
b	Long-term income elasticity of money	
d	Depreciation rate	
$\xi$	Overtime parameter	

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