

The Determinants of the Commercial Banks' Credit Potential in a Mixed Money System

1. — For the purpose of the present study a « mixed money system » is taken to mean a monetary system in which Central Bank money (comprising notes of and deposits at the Central Bank) and sight balances (demand deposits of non-bank customers (the public and the State) at the commercial banks (which may be called commercial banks' deposit money) serve as payment media, while Central Bank money is the sole ultimate legal tender. We speak of a single-tier mixed money system when the credit apparatus consists of a single Central Bank and a group of commercial banks.

The credit apparatus in most countries nowadays corresponds to the pattern of the single-tier mixed money system. There is an exception in the case of the German Federal Republic, which has a two-tier mixed money system. This system comprises a number of *Landeszentralbanken* (namely 9 *Landeszentralbanken*) and the *Bank deutscher Länder*, which is superior to them and has the sole right to issue bank notes; the *Bank deutscher Länder* however does not issue these bank notes itself, but puts them into circulation through the Central Banks. Just as the commercial banks keep accounts at the *Landeszentralbanken*, so these latter keep accounts at the *Bank deutscher Länder*; and just as the public borrow at the commercial banks, so the *Bank deutscher Länder* lends at the *Landeszentralbanken*. There are no direct dealings between the *Bank deutscher Länder* and the commercial banks. Relations between the commercial banks and the *Bank deutscher Länder* exist only through the *Landeszentralbanken*. There are however direct banking relations between the *Bank deutscher Länder* and the Federal Government.

The difference between the West German two-tier system and the one-tier system in

other countries is however only of an organisational kind. *From the point of view of credit policy the credit apparatus in the German Federal Republic works like a one-tier system.*

2. — Let us now consider to what extent the system of commercial banks in the one-tier mixed money system can grant credits to nonbanks without resorting to the Central Bank. The question is thus not what amount of credits is in fact granted in a given period without resort to the Central Bank. What we do want to know is the credit *potential* of the commercial banking system, that is to say the maximum volume of credit which it can grant *without recourse to the Central Bank*.

3. — In considering this question we shall start from the assumption that the banks are required to keep certain minimum reserve ratios in the form of sight balances at the Central Bank (1).

Let us call the minimum reserve ratio r , the percentage being expressed in the form of a fraction; and let us call the sight liabilities or demand deposits of a commercial bank D . Then sight balances to the extent of at least $r.D$ will have to be kept at the Central Bank (2).

Now it is at once clear that any *individual* commercial bank can grant fresh credits *without resorting to the Central Bank* only if its stock of Central Bank money, that is its so-called cash reserve (*Barreserve*), exceeds the minimum reserve requirement $r.D$ — or in other words if the commercial bank has at its

(1) The deductions are also valid if the commercial banks maintain certain reserve ratios as a matter of habit.

(2) In the German Federal Republic this required minimum reserve has to be attained on the average of the month.

disposal surplus cash, the amount of that surplus cash being determined by the difference between the cash reserve and the minimum reserve requirement. Evidently the size of the surplus cash determines the maximum amount up to which the *individual* bank can grant fresh credits (always of course without resort to the Central Bank). This maximum amount is what we call the *credit potential* or the margin of credit grantable by the individual commercial bank. The bank in question can of course widen that margin by rediscounting bills or taking loans at the Central Bank. But the consent of the Central Bank will always be a prior requirement for such enlargement. *Without resorting to the Central Bank the individual bank can grant credits only up to the amount of its surplus cash.*

4. — Now it is a central proposition in modern credit theory that the commercial bank *system*, in the sense of the whole body of commercial banks, can build on the basis of a given amount of surplus cash a volume of credit equal to several times that amount. This process, known as the multiple creation of deposit money, has been described so often that there is no need to go into the actual process in this study (3). Let us call the surplus cash existing in the commercial bank system, in the sense of the total of the amounts of surplus cash in the individual commercial banks, ΔZ ; the minimum reserve ratio r , where $0 < r < 1$; and the fraction of the newly granted credits which the borrowers withdraw in Central Bank money and which remains in the hands of the public c , where $0 < c < 1$. Then the limit ΔL for the expansion of credit by the commercial banking system will be given by:

$$[1] \Delta L = \frac{1}{r+c} \cdot \frac{1}{(1-r)} \Delta Z$$

It is simple to deduce this relation. We use the following notations:

ΔZ surplus cash of the commercial bank system;

(3) For a full description of the process see f. ex. E. SCHNEIDER, *Einführung in die Wirtschaftstheorie*, Volume III, 2nd Edition, Tübingen 1953, page 36 ff.

ΔL the maximum volume of credit which can be created on the basis of this surplus cash;

ΔN the part of ΔL which is withdrawn in Central Bank money and remains among non-banks;

ΔD the part of ΔL which is kept in the form of sight balances at the commercial banks;

ΔZ_b the part of the excess cash remaining in the commercial bank system (that is to say, the cash reserve which has to be held against ΔD);

c the percentage ratio of cash out-payments to the credit granted;

r the minimum reserve ratio of the commercial banks.

Between these 7 quantities we now have the following 4 relations:

$$[2] \Delta N = c \cdot \Delta L$$

$$[3] \Delta L = \Delta D + \Delta N$$

$$[4] \Delta Z_b = r \cdot \Delta D$$

$$[5] \Delta Z = \Delta Z_b + \Delta N$$

The question now is what values ΔL , ΔD , ΔN and ΔZ_b must have for given values of ΔZ , r and c : that is to say, what is the maximum volume of credit and deposits that can be created with given surplus cash, given payment habits among the public, and a given minimum reserve ratio for the commercial banks. A further question is how the surplus cash originally present will be distributed between banks and non-banks, when the credit potential is fully used.

By using [2] we have from [3]:

$$[6] \Delta D = \Delta L \cdot (1-c).$$

Similarly we have from (5):

$$[7] \Delta Z_b = \Delta Z - c \cdot \Delta L.$$

And from [4] it follows that:

$$[8] r = \frac{\Delta Z - c \cdot \Delta L}{(1-c) \cdot \Delta L}$$

From [8] we have, by solving for ΔL :

$$[9] \Delta L = \frac{\Delta Z}{r+c} \cdot \frac{1}{(1-r)}$$

For N it follows from [2] that:

$$[10] \Delta N = \frac{c}{r+c} \cdot \frac{1}{(1-r)} \Delta Z$$

For ΔD we now have from [3], by using [9] and [10]:

$$[11] \Delta D = \frac{1-c}{r+c} \cdot \frac{1}{(1-r)} \Delta Z$$

The matter may be made clearer by a numeric example. Let $\Delta Z = 110$; $r = 0,1$ and $c = \frac{1}{2}$. Then the credit potential of the banking system will be:

$$\Delta L = \frac{1}{\frac{1}{10} + \frac{1}{2} \cdot \frac{9}{10}} \cdot 110 = 200$$

Where full use is made of the credit potential, there will come into existence at the commercial banks new demand deposits amounting to:

$$\Delta D = \frac{1}{2} \cdot \frac{20}{11} \cdot 110 = 100$$

The amount of Central Bank money lost by the banking system will be:

$$\Delta N = \frac{1}{2} \cdot \frac{20}{11} \cdot 110 = 100$$

The remainder of the original surplus cash, namely 10 DM, remains in the banking system as a minimum reserve against the new volume of deposits.

5. — As can be easily shown, the relation [1] or the relation [11] deduced from it is identical with relation [d] deduced by Professor A. Gambino on page 118 of No. 30 of this Review for September, 1954 (4). Let us take k to denote the ratio of ΔN to ΔD :

$$[12] k = \frac{\Delta N}{\Delta D}$$

(4) A. GAMBINO, *Money Supply and Interest Rate in Recent Macro-Economic Conceptions*, loc. cit., page 111 ff.

It then follows from [4] and [12], by addition, that:

$$k+r = \frac{\Delta N + \Delta Z_b}{\Delta D} = \frac{\Delta Z}{\Delta D}$$

or:

$$[13] \Delta D = \frac{1}{k+r} \cdot \Delta Z$$

This relation, which is relation [d] on page 118, loc. cit., can be readily carried over into our relation [11]. We need only to observe the fact that the following relation exists between k and c :

$$[14] k = \frac{c}{1-c} \text{ or } c = \frac{k}{1+k}$$

If we take the value for k out of [14] and put it into [13], we have at once our relation [1].

Similarly one obtains from the relation [1], by the use of k , the equation:

$$[15] \Delta L = \frac{1+k}{r+k} \cdot \Delta Z \quad (5)$$

6. — Before we draw further conclusions from these relations, it must once again be pointed out with emphasis that the equations [1] and [15] indicate the credit *potential* and *not* the *actual* volume of credit. They merely state the limit up to which the commercial bank system in a one-tier mixed money system can grant credits without resorting to the Central Bank. This does not mean that for given values ΔZ , r and c (or k) credits will be granted to that extent. The degree of use which will be made of the credit potential of the banking system also depends on the credit conditions (price of credit etc.) and on the behaviour of bank customers. If there are no customers who want to borrow at banks at the given conditions, then even the greatest credit potential of the commercial banks will remain unused. On the other hand, the credit potential can be enlarged beyond the limit stated in [1] by recourse to the Central Bank through the discounting of bills and/or the taking of advances. The ex-

(5) The equations [13] and [15] have already been given by J. H. ROGERS, *The Absorption of Bank Credit*, «Econometrica», Volume I, 1933, page 63 ff.

tent to which such recourse to the Central Bank may be possible will of course be determined by the Central Bank alone.

Similarly the relations [11] and [13] do not indicate the actual volume of deposits at the commercial banks for given values of r and c (or k), but the maximum volume of deposits which will be formed in the banking system where full use is made of the credit potential.

7. — Since in [1] r and c are always positive and lie between 0 and 1, the factor:

$$[16] \quad \gamma = \frac{1}{r+c \cdot (1-r)} = \frac{1+k}{r+k}$$

VALUES OF MONEY-CREATION MULTIPLIER ($\gamma = \frac{1}{r+c \cdot (1-r)}$) FOR ALTERNATIVE VALUES OF c AND r

TABLE I

$r \backslash c$	0,0	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
0,0	0,0	10,000	5,000	3,333	2,500	2,000	1,666	1,429	1,250	1,111	1,000
0,1	10,000	5,263	3,572	2,703	2,174	1,818	1,563	1,370	1,220	1,099	1,000
0,2	5,000	3,527	2,778	2,273	1,923	1,667	1,471	1,316	1,190	1,087	1,000
0,3	3,333	2,702	2,273	1,961	1,724	1,538	1,389	1,266	1,163	1,075	1,000
0,4	2,500	2,174	1,923	1,724	1,563	1,429	1,316	1,220	1,136	1,064	1,000
0,5	2,000	1,818	1,667	1,538	1,429	1,333	1,250	1,176	1,111	1,052	1,000
0,6	1,666	1,563	1,471	1,389	1,316	1,250	1,190	1,136	1,087	1,042	1,000
0,7	1,429	1,367	1,316	1,266	1,220	1,176	1,136	1,099	1,064	1,031	1,000
0,8	1,250	1,220	1,190	1,163	1,136	1,111	1,087	1,064	1,042	1,020	1,000
0,9	1,111	1,099	1,087	1,075	1,064	1,053	1,042	1,031	1,020	1,010	1,000
1,0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000

VALUES OF MONEY-CREATION MULTIPLIER ($\gamma = \frac{1+k}{r+k}$) FOR ALTERNATIVE VALUES OF k AND r

TABLE II

$r \backslash k$	0,0	0,1	0,5	1,0	2,0	5,0	10,0	50,0	100,0	∞
0,0	0,0	11,111	3,000	2,000	1,500	1,200	1,100	1,020	1,010	1,0
0,1	10,000	5,525	2,500	1,818	1,429	1,176	1,089	1,018	1,009	1,0
0,2	5,000	3,667	2,143	1,667	1,363	1,154	1,079	1,016	1,008	1,0
0,3	3,333	2,750	2,875	1,538	1,304	1,132	1,068	1,014	1,007	1,0
0,4	2,500	2,200	1,667	1,429	1,250	1,111	1,058	1,012	1,006	1,0
0,5	2,000	1,834	1,500	1,333	1,200	1,091	1,048	1,010	1,005	1,0
0,6	1,667	1,572	1,364	1,250	1,154	1,071	1,038	1,008	1,004	1,0
0,7	1,429	1,375	1,250	1,176	1,111	1,053	1,028	1,006	1,003	1,0
0,8	1,250	1,222	1,154	1,111	1,072	1,034	1,019	1,004	1,002	1,0
0,9	1,111	1,100	1,072	1,053	1,034	1,017	1,009	1,002	1,001	1,0
1,0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,0

in [1] will always be greater than 1. It indicates what is the maximum volume of credit which can be built by the commercial bank system through multiple creation of deposit money on surplus cash amounting to 1 DM. We describe this factor as the *money-creation multiplier of the commercial bank system*. Tables I and II contain the values of the money-creation multiplier for various values of r and c or k . Fig. 1 shows the relation between γ and r for various values of c . It is immediately apparent that the greater γ is the smaller r and c will be.

In view of [14] where $0 < c < 1$ the value k will always be positive ($k > 0$).

As can be easily seen, the « deposit multiplier » $\frac{1}{k+r}$ in [13] or in [11] may assume all positive values. It may be smaller or greater than 1, and may also be equal to 1.

What is of course of special interest from the economic point of view is the *credit potential* of the commercial bank system. We shall therefore deal mainly with this point. Apart from this the maximum volume of deposits

potential and also the absolute magnitude of the corresponding volume of deposits in the commercial bank system. These factors are:

- (a) the excess cash ΔZ in the commercial bank system;
- (b) the minimum reserve ratio r ;
- (c) the payment habits of non-bank customers given by c or k .

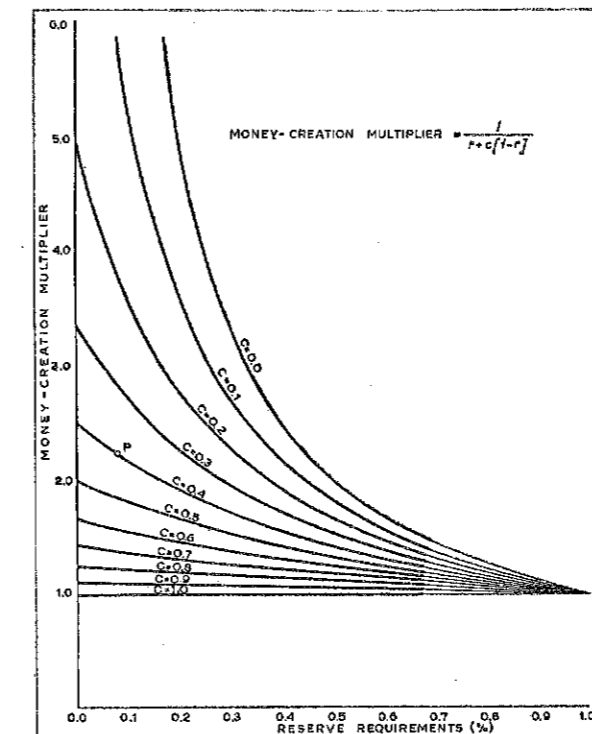
These three quantities give the factors which, as Gambino rightly points out (6), directly and explicitly determine the credit potential and the corresponding volume of deposits. Let us consider these quantities in a little more detail.

As to (a): In all banking systems which have at their disposal the instrument of open market policy, the excess cash is a fixation parameter of the Central Bank. By buying or selling fixed interest-bearing securities on the open market the Central Bank can increase or reduce the quantity of Central Bank money present in the commercial bank system, and can thereby vary the amount of the surplus cash accordingly.

In the German Federal Republic the Central Bank is allowed to conduct such open market operations only on the money market, that is to say on the market for Central Bank money where the banks appear with offers and demands (7). As the *Bank deutscher Länder* states in its Report for the year 1954, « the possibility of affecting the course of money market rates through open market operations has however been comparatively slight so far, because the Central Banking System had available only a very small quantity of suitable securities » (8). It is only since 15th May 1955 that the *Bank deutscher Länder* has been able « for the purpose of regulating the money market to put into circulation up to a total of DM 2,000 million in either Treasury Bills or non-interest bearing Treasury Bonds of the Federal Government, as may be required, the latter to run for periods of up to two years ». (9). Such securities are bought and sold at flexible rates which the *Bank deutscher Länder* fixes from time to time. In this way the *Bank deutscher Länder* is in a position « to absorb substantial amounts of liquid funds at the points where such funds initially accumulate » (10). Thus the *Bank deutscher Länder*

THE MONEY-CREATION MULTIPLIER AS A FUNCTION OF THE RESERVE REQUIREMENTS, GIVEN DIFFERENT PAYMENT HABITS

Fig. 1



and the credit potential are closely related. From [13] and [15] it follows that:

$$[17] \quad \frac{\Delta D}{\Delta L} = \frac{1}{1+k}$$

Thus the volume of deposits corresponding to any given credit potential is always smaller than that credit potential. The ratio of ΔD to ΔL depends only on k , and becomes smaller as k becomes greater:

8. — From the relations [1] or [15] and [11] or [13] we can now immediately see what are the factors determining the credit

(6) *loc. cit.*, page 118.

(7) Article 13 of the Law concerning the Establishment of the Landeszentralbanken.

(8) *loc. cit.*, page 54; see also pages 22-23.

(9) Monthly Report of the *Bank deutscher Länder* for May, 1955, page 13 (page number and quotations are those in the English version of the Reports).

(10) Report of the *Bank deutscher Länder* for the Year 1954, pages 23-24 (of the English version).

can influence not only the periodical fluctuations in money market (this being the interest-effect of its open market operations), but also the quantity of Central Bank money in the banking system (this being the quantity-effect of those operations). In conjunction with the policy of minimum reserves the *Bank deutscher Länder* accordingly has in its hands « two very effective instruments, which might readily supplement one another » (11), for the purpose of controlling the credit potential of the commercial banks.

standing in a fixed relation to their borrowed funds. The level of the minimum reserve ratios and the method of holding those reserves are to be laid down by the Board of Directors of the *Landeszentralbank* according to regulations enacted by the Board of Directors of the *Bank deutscher Länder*. Table III below shows what the minimum reserve ratios have been since 1948, in which connection it should be borne in mind that as from 1st May, 1952 the reserve ratios have been differentiated according to the amount of

RESERVE REQUIREMENTS

TABLE III

Applicable as from:	Sight Liabilities												Time Liabilities						Saving Deposits
	at « Bank Places » (*)						at other places (*)						Reserve Class (a)						
	Reserve Class (a)																		
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	
In percent of the Liabilities subject to the Reserve Requirement																			
1948																			
July	10						10						5						
Dec.	15						10						5						
1949																			
June	12						9						5						
Sept.	10						8						4						
1950																			
Oct.	15						12						8						
1952	15	14	13	12	11	10	12	11	10	9	8	8	8	7.5	7	6.5	6	5.5	4
May	12	12	11	11	10	9	10	10	9	9	8	8	7	7	6	6	5	5	4
Sept.	11	11	10	10	9	9	9	9	8	8	8	8	7	7	6	6	5	5	4
1953																			
Feb.	11	11	10	10	9	9	9	9	8	8	8	8	7	7	6	6	5	5	4

(*) « Bank places » are places at which there is a *Landeszentralbank* or a branch of a *Landeszentralbank*.

(a) Since 1 May 1952 the credit institutions have been graded as follows, the amounts representing the totals of their liabilities (other than savings deposits) subject to the reserve requirement:

Millions of DM		Millions of DM	
Reserve Class 1	100 and over	Reserve Class 4	From 5 to under 10
» » 2	From 50 to under 100	» » 5	» 1 » 5
» » 3	» 10 » 50	» » 6	under 1

As to (b): The minimum reserve ratio is also a fixation parameter for the Central Banking System.

Under Article 14, paragraph 2 of the *Landeszentralbank*-Law it is required in the German Federal Republic that credit institutions which have their head office or a branch within the Land in question shall keep at the *Landeszentralbank* minimum reserves

(11) Report of the *Bank deutscher Länder* for the Year 1954, page 24 (of the English version).

the credit institutions' liabilities carrying the reserve requirements.

Relation [16] immediately shows that, other things being equal, the credit potential of the commercial banks will be reduced by a raising of the minimum reserve ratio and increased by a lowering of that ratio.

As to (c): The size of c or k is a fixation parameter of non-bank customers. c indicates

what percentage ratio of the credits granted by the commercial banks is withdrawn by the borrowers in Central Bank money and remains outside the banks. The size of k shows how any change in the quantity of money outside the banks is distributed between notes (and coin) on the one hand and sight balances at the commercial banks on the other. Both these quantities, which as indicated above are closely related to each other, reflect whatever preference may be shown by non-banks as to the way in which they hold their cash. For a given reserve ratio r the value of c or k determines the money-creation multiplier; and consequently, for any given excess reserve, it indicates the credit potential of the commercial bank system. The more widespread the *cashless method of effecting payments (bargeldloser Zahlungsverkehr)* is in any country, the smaller c will be, and the greater will be the money-creation multiplier for a given reserve ratio r . The non-banks can accordingly affect the credit potential of the commercial bank system through variations in c .

9. — A number of attempts have been made to measure the size of c or k .

(a) According to Keynes, Governor Strong estimated (12), « in his evidence before the U.S. Congress Committee on Stabilisation, that the *increment* of cash in circulation is in the United States about 20 per cent of the *increment* in demand deposits, and the reserves 10 per cent of the demand deposits ». Keynes then adds: « If these figures are correct, an injection of additional resources (in cash or Central Bank money) will lead to an ultimate increase in demand deposits equal to 3.3 times the amount of the additional resources ». According to Strong's estimate the position was therefore that:

$$k = \frac{1}{5} \text{ and } r = \frac{1}{10}$$

and accordingly:

$$\frac{1}{k+r} = 3 \frac{1}{3}$$

(12) J. M. KEYNES, *A Treatise on Money*, Volume II, London, 1930, page 51 (Italics are mine).

(b) In 1932, in the course of an investigation of the orders of magnitude in the German monetary system (13), J. Marschak and W. Lederer calculated values for the quantities that are relevant for this purpose. Let us call the amount of cash held by credit institutions and by non-banks respectively N_b and N , and the sight balances of non-banks at credit institutions D . On this basis Marschak and Lederer found for Germany in 1929/30:

$$N_b : N : D = \frac{1}{2} : \frac{11}{2} : 6 \text{ to } 8$$

from which it follows that:

$$\frac{N}{D} = \frac{11}{12} \text{ to } \frac{11}{16}$$

and

$$r = \frac{1}{2} : 6 \text{ to } 8 = \frac{1}{12} \text{ to } \frac{1}{16}$$

(c) In 1934 J. E. Meade made some further measurements for Great Britain for the period 1925 to 1930 in a study entitled « *The Amount of Money and the Banking System* » (14).

The quantity measured by Meade is $\frac{N}{N+D}$ and his measurements yielded the following results:

	$\frac{N}{N+D}$	$\frac{N}{D}$
1925	0.148	0.18
1926	0.145	0.18
1927	0.139	0.16
1928	0.135	0.16
1929	0.129	0.15
1930	0.127	0.15
Average	0.137	0.16

Thus the values of $\frac{N}{N+D}$ and $\frac{N}{D}$ show a slight fall.

As can be easily verified, where other things are equal such small variations have

(13) J. MARSCHAK and W. LEDERER, *Größenordnungen des deutschen Geldsystems*, « Archiv für Sozialwissenschaft und Sozialpolitik », Volume 67, 1932, page 385 ff., especially page 400.

(14) « Economic Journal », Volume 44, 1934, page 77 ff.

no material influence on the credit potential or on the corresponding volume of deposits.

(d) An attempt to measure the preference shown by non-banks as between deposits at the commercial banks on the one hand and notes and coin on the other has recently been made by A. Gambino for the period from 1947 to 1951 in Italy (15). However, the values which he finds for K_p , being the ratio of absolute volume of deposits to the amount of bank notes in the hands of the public, cannot be used for the relations which we are here considering because Gambino evidently includes in D not only the slight deposits but also the time and savings deposits (16).

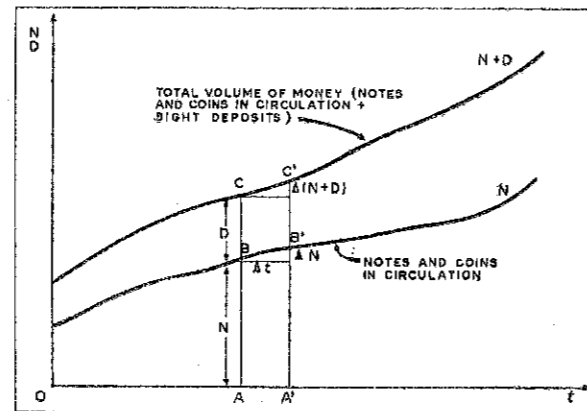
10. — In connection with the evaluating of these measurements within the framework of our inquiry there is an important point to bear in mind. If one has to answer the question what is the maximum amount of credits which the commercial bank system can grant on the basis of a specified surplus reserve, the only thing which it is important for us to know is how the quantity of *additional* money that arises among non-banks when credit is granted will be distributed between notes and coin on the one hand and sight balances at the commercial banks on the other. The value of c or k accordingly expresses the ratio of marginal and not of absolute quantities. Regarded in this light, therefore, only Strong's statement would meet our requirements, while Meade's measurements, representing as they do quotients between total quantities, appear to be not relevant to the size of the credit potential. Such a conclusion would however be over-hasty. In Fig. 2 the N -curve is intended to represent the movement in function of time of the note and coin circulation, while the $(N+D)$ -curve represents the movement in function of time of the money supply

(15) A. GAMBINO, *La ricostruzione dei depositi bancari in Italia*, in « Moneta e Credito », No. 24, 1953; see also A. GAMBINO, *loc. cit.*

(16) On page 116 of Gambino's article on *Money Supply and Interest Rate in Recent Macro-Economic Conceptions*, *loc. cit.*, it is expressly stated that « time deposits and savings deposits are included among the latter » (i. e. deposits « as a whole »). This inclusion of the savings and time deposits in D no doubt accounts for the extremely great variation of the quantity K_p , which Gambino observed for Italy in the course of the period.

in the sense of the note and coin circulation plus sight deposits at commercial banks, as we find these in the statistics. It is immediately clear that the ratio $\frac{N}{D}$ will at all times afford information as to the way in which cash is held outside the banks. That ratio in fact $\left(\frac{N}{D}\right)$ shows what part of the cash of non-banks is held in notes (and coin), and what part is

Fig. 2
QUANTITY OF MONEY IN CIRCULATION OUTSIDE THE CREDIT INSTITUTIONS



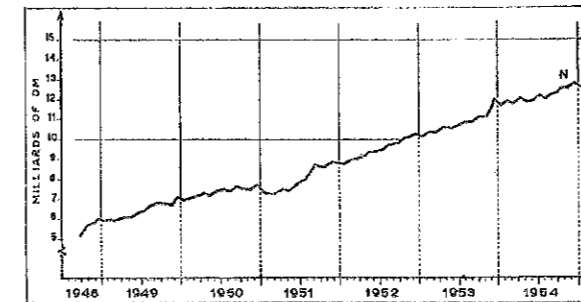
$N + D$ curve: total volume of money (notes and coins in circulation + sight deposits). N curve: notes and coins in circulation.

held in sight balances at the commercial banks. The quotients $\frac{N}{D}$ and $\frac{N}{N+D}$ accordingly express, at any given time, the preference as between the two possible methods of holding cash. In an economy where the cashless payment system is well developed the quotient $\frac{N}{D}$ will of course be smaller than in one where it is less developed. There can therefore be no doubt that payment habits too are reflected in the values of $\frac{N}{D}$ and $\frac{N}{N+D}$.

If at a given moment $\frac{N}{N+D} = \frac{3}{4}$, then it is at all events not unfair to assume that people who take credits at around that time will on the whole dispose of the proceeds in approximately the same ratio. This on the other

Fig. 2

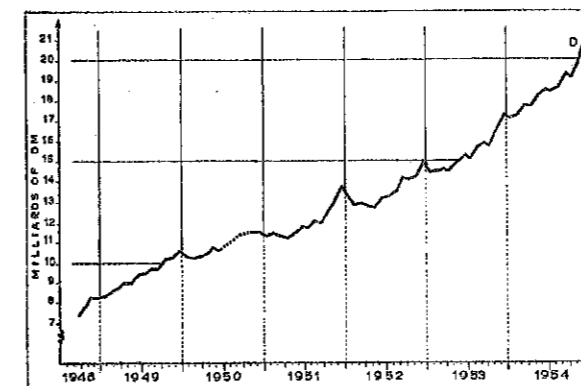
Fig. 3
NOTES AND COINS IN CIRCULATION OUTSIDE THE CREDIT INSTITUTIONS IN THE GERMAN FEDERAL REPUBLIC FROM 1948 TO 1954



hand cannot be said in regard to the ratio $\frac{\Delta N}{\Delta(N+D)}$, where ΔN denotes the change in the note and coin circulation and $\Delta(N+D)$ denotes the change in the quantity of money among non-banks in the short period Δt . It can at once be seen that this ratio cannot express the payment habits in the short period

Fig. 3

Fig. 4
SIGHT DEPOSITS OF ENTERPRISES (PRIVATE PARTIES AND PUBLIC AGENCIES) IN THE BANKING SYSTEM OF THE GERMAN FEDERAL REPUBLIC (1948-1954)

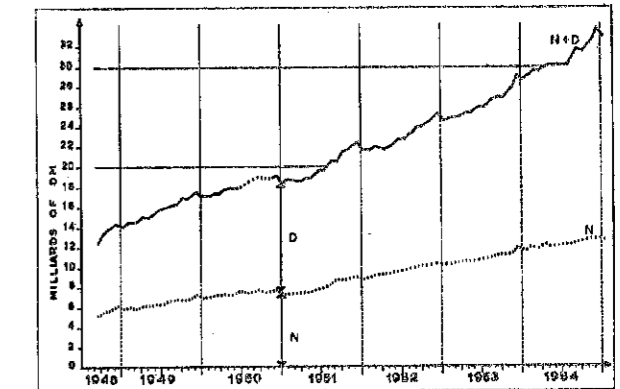


that is considered. One need think only of the case in which the money supply is continuously rising, while the note circulation on the other hand remains constant. The quotient $\frac{\Delta N}{\Delta(N+D)}$ would then be continuously constant. It would in fact be zero, and accordingly indicate constant payment habits, whereas obviously the preference of non-banks would have moved in favour of cashless trans-

fers. If in this case one were to select $\frac{\Delta N}{\Delta(N+D)}$ as a measure of the value of c , then this would mean that people who took newly granted credits were disposing of them entirely in cashless form — a conclusion which obviously cannot be drawn from the fact that in the time series diagram for any period $\frac{\Delta N}{\Delta(N+D)} = 0$. The only measure of c or k which can be regarded as usable must there-

Fig. 4

Fig. 5
TOTAL QUANTITY OF MONEY ($N + D$) IN THE GERMAN FEDERAL REPUBLIC (1948-1954)

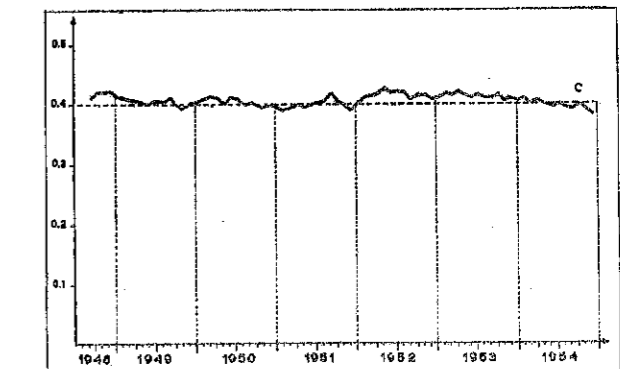


fore be the ratio between the absolute quantities N and D on the one hand, or $N+D$ on the other, as given by the statistics.

11. — It is in the light of these considerations that c and k have been calculated below for the German Federal Republic in the period

Fig. 5

Fig. 6
VALUES OF c ($= \frac{N}{N+D}$) IN THE GERMAN FEDERAL REPUBLIC (SEPTEMBER 1948 - DECEMBER 1954)



Year	Month	Notes and coins in circulation	Sight Deposits	$k = \frac{(1)}{(2)}$	$c = \frac{(1)}{(2) + (1)}$
		(Millions of DM) (1)	(Millions of DM) (2)	(3)	(4)
1949	Jan.	5,903	8,261	0.72	0.42
	Feb.	5,962	8,487	0.70	0.41
	March	5,935	8,637	0.69	0.41
	April	6,077	8,930	0.68	0.41
	May	6,093	8,972	0.68	0.41
	June	6,287	9,360	0.67	0.40
	July	6,417	9,430	0.68	0.41
	Aug.	6,536	9,605	0.68	0.41
	Sept.	6,763	9,617	0.70	0.41
	Oct.	6,769	10,149	0.67	0.40
	Nov.	6,670	10,269	0.65	0.39
	Dec.	7,058	10,541	0.67	0.40
1950	Jan.	6,902	10,214	0.68	0.41
	Feb.	7,000	10,134	0.69	0.41
	March	7,148	10,201	0.71	0.42
	April	7,279	10,330	0.71	0.42
	May	7,168	10,712	0.67	0.40
	June	7,440	10,552	0.71	0.42
	July	7,494	—	—	—
	Aug.	7,409	—	—	—
	Sept.	7,627	11,311	0.68	0.41
	Oct.	7,512	—	—	—
	Nov.	7,487	11,431	0.66	0.40
	Dec.	7,682	11,470	0.67	0.40
1951	Jan.	7,209	11,200	0.64	0.39
	Feb.	7,222	11,409	0.63	0.39
	March	7,292	11,258	0.65	0.39
	April	7,451	11,122	0.67	0.40
	May	7,395	11,423	0.65	0.39
	June	7,781	11,773	0.66	0.40
	July	7,946	11,743	0.68	0.41
	Aug.	8,331	12,090	0.69	0.41
	Sept.	8,656	11,955	0.72	0.42
	Oct.	8,562	12,491	0.69	0.41
	Nov.	8,778	13,083	0.67	0.40
	Dec.	8,801	13,701	0.64	0.39
1952	Jan.	8,685	12,909	0.67	0.40
	Feb.	8,977	12,758	0.70	0.41
	March	9,054	12,855	0.70	0.41
	April	9,157	12,750	0.72	0.42
	May	9,365	12,688	0.74	0.43
	June	9,440	13,137	0.72	0.42
	July	9,484	13,191	0.72	0.42
	Aug.	9,766	13,479	0.73	0.42
	Sept.	9,838	14,158	0.70	0.41
	Oct.	10,003	14,066	0.71	0.42
	Nov.	10,129	14,210	0.71	0.42
	Dec.	10,217	14,963	0.68	0.41
1953	Jan.	10,089	14,406	0.70	0.41
	Feb.	10,323	14,469	0.71	0.42
	March	10,310	14,564	0.71	0.42
	April	10,535	14,521	0.73	0.42
	May	10,501	14,912	0.70	0.41
	June	10,564	15,236	0.69	0.41
	July	10,791	15,074	0.72	0.42
	Aug.	10,859	15,649	0.69	0.41
	Sept.	11,017	15,892	0.69	0.41
	Oct.	11,149	15,783	0.71	0.41
	Nov.	11,126	16,464	0.68	0.40
	Dec.	11,972	17,206	0.70	0.41
1954	Jan.	11,667	17,093	0.68	0.41
	Feb.	11,885	17,188	0.69	0.41
	March	11,791	17,707	0.67	0.40
	April	12,035	17,625	0.68	0.41
	May	11,886	18,147	0.65	0.39
	June	11,930	18,498	0.65	0.39
	July	12,158	18,363	0.66	0.40
	Aug.	12,076	18,524	0.65	0.39
	Sept.	12,358	19,296	0.64	0.39
	Oct.	12,581	19,056	0.66	0.40
	Nov.	12,556	19,833	0.63	0.39
	Dec.	12,781	21,169	0.60	0.38

from 1949 to 1954. Table IV contains in Columns 1 and 2 the amount of the note and coin circulation, and of the sight balances held by non-banks in the banking system, in the form of monthly figures. Columns 3 and 4 contain the calculated values for c and k . Figs. 3, 4 and 5 show the time series for the note and coin circulation (N), the sight deposits (D) of business and private customers and public authorities in the banking system, as well as the time series for the quantity of ($N + D$). From Column 4 in Table IV and from Fig. 6 it can at once be seen that between September, 1948 and December, 1954 the value of c in the German Federal Republic shows only slight variations around 0.4. We are therefore entitled to say that on the average 4/10ths of the cash of non-banks are kept in the form of notes and coin, and 6/10ths in that of sight deposits at the banks. By comparison with what Marschak and Lederer found for 1932 these have accordingly been some slight increase in the preference for sight deposits as against notes. For the German Federal Republic it is accordingly true to say that the way in which cash was held, and accordingly the value of c , can be regarded as practically constant for the period considered. Thus in substance the variations in the credit potential of the commercial banks must be attributed solely to changes in the amount of the surplus cash and in the minimum reserve ratio. The point P in Fig. 1 shows the value of the money-creation multiplier for the German Federal Republic at the present time (before Sept. 1, 1955), with the minimum reserve ratio on the average 9% and $c = 0.4$.

12. — If in any country the value of c does not show the same constancy as that which we have found for Germany in the period considered, this does not of course mean that the non-banks can frustrate the Central Bank's credit policy by varying their preference as to the way in which they hold their cash — always presupposing, of course, that the Central Bank has at its disposal the appropriate means of enforcing credit policy. The basis on which the commercial banks grant credit is always the existence of surplus cash ΔZ . The minimum reserve ratio r and the cash-holding preference k or c determine what is the maximum volume of credit that can be built on a given amount of surplus cash through the process of multiple creation of deposit money. It is at once clear that every variation in k or c which affects the credit potential in a direction not desired by the Central Bank can be offset by the Central Bank through appropriate variation of that surplus cash (say by the use of open market operations), and can be further offset by variation of r in countries where the minimum reserve ratio is a fixation parameter of the Central Bank. In all cases the Central Bank is and remains the controller of the credit system and of the volume of credit. It is exclusively within the Central Bank's power to determine the extent to which it will give the banks surplus cash or take it away from them (17).

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(17) An increased propensity to save is thus never a necessary prior condition for the granting of fresh credits. The only thing required to enable the commercial banks to grant fresh credits is the existence of surplus cash in the commercial bank system.