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Author(s): James Tobin

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LIQUIDITY PREFERENCE AND MONETARY POLICY

JAMES TOBIN

THE contention of this paper is that the demand for cash balances is unlikely to be perfectly inelastic with respect to the rate of interest, and that policy conclusions which depend on the assumption that the demand for cash balances is interest-inelastic are therefore likely to be incorrect. First, the relationship between monetary and fiscal policy recommendations and assumptions concerning the interest-elasticity of the demand for cash balances will be examined. Second, the argument of Dr. Clark Warburton, whose "Monetary Theory of Deficit Spending" implicitly depends on the interest-inelasticity of the demand for cash balances, will be considered. Third, the position of Professor William Fellner, who explicitly makes and defends the same assumption, will be reviewed. It will be held that this assumption leads Professor Fellner into a theoretical dilemma which can be escaped only by abandoning the assumption, and that Professor Fellner's reasons for believing the demand for cash balances to be interest-inelastic are inadequate. Finally, a statistical relationship between the demand for cash balances and the rate of interest will be presented; this relationship, though admittedly not conclusive, is difficult to reconcile with the hypothesis that the demand for cash balances is interest-inelastic.

I. RELATIONSHIP BETWEEN ASSUMPTIONS AND POLICIES

Questions of policy often serve to expose with clarity differences in theory. In the field of monetary theory and policy, two crucial test questions are:

1. Will expansion of the money supply by methods which do not directly generate income — e.g., open market purchases — lead to an expansion of money national income?

2. Will expansion of income-generating expenditures financed by methods which do not increase the money supply succeed in increasing money national income?

At the level of static aggregative theory, the answers to these questions of policy depend on the views held with regard to the shapes of three functions: the "L" function, expressing the demand for cash balances as a function of the rate of interest; the "I" function, expressing investment demand as a function of the interest rate; and the "S" function, expressing the supply of current saving as a function of the interest rate. Naturally, the demand for cash balances, investment, and saving are functions of variables other than the interest rate; most important, the demand for cash balances, saving, and perhaps also investment are functions of the level of money income. But it is the nature of their partial elasticities with respect to the rate of interest which is the major issue.

The relationship between views on the interest-elasticities of these functions and views on the two test questions of monetary policy are summarized in Table 1.

A. To assume that the "L" function is perfectly inelastic means that no change in the price of securities, i.e., in the interest rate, will induce substitution of money for securities, or vice versa. Changes in the money supply must therefore be absorbed entirely by substitution between goods and money. An addition to the money supply must result in an equivalent increase in the demand for cash balances, so that the additional money will be willingly held. Since no additional money will be willingly held as idle balances, i.e., in place of securities, the demand for cash for working balances must increase enough to absorb all of the additional supply. Money national income, which determines the demand for working balances, must rise until the cash required to handle it has increased as much as the money supply. There are two explanations of the process by which money national income is thus increased, one naive and the other sophisticated.

The naive explanation merely notes that if M is increased, the community will have unwanted cash holdings and will seek to spend

them until increased spending has restored the desired relationship between their incomes and their cash balances. The implicit proposition in regard to the community's decisions to spend money on goods is simply that whether total spending, including investment and consumption, exceeds, equals, or falls short of current money income depends directly on

cient condition for the expansion of money national income. How great this expansion is depends only on the relationship between money national income and requirements for working cash balances. This relationship is usually taken to be a constant ratio, changing only slowly over time. The ratio is determined by the degree of synchronization of income and

TABLE I

Interest-Elasticities	Effectiveness of Monetary Policy Alone (question 1)	Effectiveness of Income-Generating Expenditures Alone (question 2)
(A) "L" function perfectly inelastic, implying either "I" function not perfectly inelastic, or "S" function of positive elasticity, or both.	Effective (constant velocity of money)	Ineffective
(B) "L" function elasticity between 0 and ∞ , and either "I" function not perfectly inelastic or "S" function of positive elasticity or both.	Effective, but Less than (A)	Effective, but Less than (C)
(C) (a) "L" function perfectly elastic, regardless of other elasticities, or (b) "I" & "S" functions perfectly inelastic, regardless of "L" function.	Ineffective	Effective (complete leverage effect)

whether actual cash balances exceed, equal, or fall short of required cash balances.

The sophisticated explanation arrives at the same result, but does not rely on a doubtful direct relationship between consumption and investment decisions and the size of cash balances. Instead, investment and consumption expenditures are assumed to depend on the level of income and on the interest rate. Adding to the quantity of money creates unwanted cash balances which will be used to bid up the price of securities and lower the interest rate. Reduction of the interest rate induces an increase in spending, by encouraging investment or by discouraging saving. The expansion of income proceeds until all the additional money is required for working balances, since the decline in the interest rate cannot induce the public to hold larger idle balances. It is clear from this explanation that since the "L" function is perfectly inelastic with respect to the interest rate, then either the "I" function or the "S" function must not be interest-inelastic. Otherwise there would be no mechanism to restore equilibrium between the demand and supply of money.

On either explanation, the conclusion is that an increase in the quantity of money is a suffi-

cient condition for the expansion of money national income. The velocity of money, the reciprocal of this ratio, is consequently a constant.

An increase in the quantity of money is also a necessary condition for an expansion of money national income. There can be no increase in money national income unless additional money is made available to support the higher value of transactions. It follows that added business investment (an upward shift in the "I" function) or government spending, financed by means which do not expand the money supply, cannot expand money national income. For the additional transactions involved in such spending will decrease the ratio of cash balances to money national income, and the community will endeavor to restore the desired ratio by reducing its other spending in order to acquire larger balances. Since the supply of money has not increased, this process will continue until the reduction of spending has cut income to its original level. The initial addition to business or government spending is offset by equal reductions in other spending. The sophisticated explanation of the same process would be that the attempt to obtain additional balances to support the ini-

tial increase in spending raises the rate of interest. But, since no rise in the interest rate will induce dishoarding, no addition to working balances can be obtained in this way. Therefore the rise in the interest rate must continue until enough consumption and investment expenditure is discouraged to offset completely the initial increase in spending, leaving the level of money income unchanged.

B. If the demand for cash balances is not completely inelastic with respect to the rate of interest, part of an addition to M will end up in idle balances. The added money will be used to bid down the rate of interest, and the lowering of the rate of interest will make the community willing to hold larger idle balances. So long as either investment or the propensity to consume is favorably affected by a lowering of the interest rate, there will also be an increase in money income. But since there is some increase in idle balances, the increase in money national income cannot be proportional to the increase in M ; V cannot be considered a constant. On this set of assumptions, monetary expansion alone can increase money national income but not so effectively as under (A).

Similarly, on this set of assumptions, an increase in spending without any increase in M can succeed in expanding income. The additional transactions demand for money will raise the interest rate, and this rise in the interest rate will induce the community to hold smaller idle balances. Greater working balances are thereby made available to support a higher money national income. The increase in spending will increase national income, but not by the full leverage effect because the rise in the interest rate will cause a partially offsetting decline in other spending.

C. Under the third set of assumptions, purely monetary policy is impotent. An increase in the quantity of money merely piles up in idle balances; it requires no reduction in the rate of interest to induce the public to hold them. Or, if the rate of interest is reduced, investment and consumption expenditure are both insensitive to the reduction. In either event, there is no expansion of income. On the other hand, an increase in spending can be supported entirely by balances otherwise idle. Either these balances can be obtained for

transactions purposes without a rise in the rate of interest, or, if a rise in the interest rate occurs, it has no effect on other spending. The initial increase in spending, therefore, will increase national income by the full amount of its leverage effect.

II. WARBURTON'S "MONETARY THEORY OF DEFICIT SPENDING"¹

Dr. Warburton does not explicitly recognize that his "Monetary Theory of Deficit Spending" depends on the special assumption that the demand for cash balances is perfectly inelastic with respect to the rate of interest. But a mere statement of his propositions will suffice to show that they belong in category (A) discussed above. His main contentions can be summarized as follows:

1. The value of the gross national product is the product of the quantity of money and a circular velocity of money. For various reasons, outlined in the article, the circular velocity is gradually decreasing. Aside from this secular trend, V is a fairly stable quantity determined by the habits of payments of the community.² Therefore, fluctuations in GNP can be explained largely by changes in M .

2. Deficit spending is one of a number of techniques by which M may be increased. Deficit spending, like the other techniques, increases GNP by the amount of the increase in M associated with it times the circular velocity of money.

3. Net increases or decreases in total debt, whether public or private, need not imply changes in GNP if only the monetary authority keeps M increasing at a rate which just offsets the secular decline in V .³

It might be expected that such propositions

¹ This REVIEW, XXVII (1945), pp. 74-84.

² This view of the stability of V is emphatically reaffirmed by Dr. Warburton in his Reply to H. W. Arndt's Comment, this REVIEW, XXVIII (1946), p. 92.

³ These propositions raise the incidental problem of controlling the quantity of money independently of the volume of public and private debt and of public and private deficit spending. In particular, M must be expanded at a rate sufficient to compensate for the decline in its rate of use, while total debt either remains unchanged or indeed is retired. Although Dr. Warburton emphasizes the breadth of his conception of monetary policy, most methods of monetary control would be unavailable to him since they involve direct or induced changes in public or private debt.

would be buttressed by arguments in favor of the assumption that the demand for cash balances is perfectly inelastic with respect to the interest rate. No such arguments are presented. Dr. Warburton does present a correlation of gross national product with the quantity of money, after the quantity of money is corrected for his geometric secular decline in velocity. But this "secular" decline in velocity can be interpreted in a manner completely contradictory to Dr. Warburton's thesis. During most of the period, interest rates were declining; and at the extremely low rates of the 1930's the demand for cash balances may be so elastic with respect to the rate of interest that almost indefinite quantities of cash will be willingly held idle. This is what seems to have happened to the additions to the money supply during that decade. If this interpretation is correct, the only result of following Dr. Warburton's advice to keep the quantity of money increasing fast enough to offset the "secular" decline in velocity would be to accelerate the decline in velocity itself.

III. FELLNER'S "MONETARY POLICIES AND FULL EMPLOYMENT"⁴

Professor Fellner examines thoroughly and supports ably the theoretical assumptions on which his policy conclusions are based. Indeed his ultimate recommendation, with which adherents of any of our three positions could agree, is a combination of fiscal and monetary measures. The surest method to expand national income is government deficit spending financed directly or indirectly by borrowing from the central bank.

Professor Fellner believes that the "L" function is inelastic with respect to the rate of interest; consequently he is pessimistic concerning the results of deficit spending unaccompanied by an increase in the quantity of money. In fact, he is one degree more pessimistic concerning deficit spending than Dr. Warburton. For he suspects also that banks' demand for reserve balances as a percentage of their deposits is inelastic with respect to the rate of

interest.⁵ This means that no rise in the interest rate will suffice to induce banks to permit their deposits to increase unless their reserves are increased. For this reason, Professor Fellner has hope only for policies which increase bank reserves at the same time that they increase the quantity of money.

The chief issue remains the elasticity of the "L" function. Even if banks behave in the manner Professor Fellner fears, this would prevent deficit spending financed by methods which do not increase bank reserves from being effective only if the "L" function is perfectly inelastic. Banks' insistence on a certain reserve ratio merely places selling bonds to commercial banks as a means of deficit financing on the same footing as selling bonds to individuals. Both become methods of increasing income-generating expenditures without changing the quantity of money. They will fail, as shown in section I, only if the demand for cash balances is perfectly inelastic with respect to the interest rate.

For different reasons, Professor Fellner is less optimistic than Dr. Warburton concerning the effectiveness of monetary policy alone. He believes that the "L" function is inelastic and he concurs with the usual agnostic assumption that the "S" function is perfectly inelastic with respect to the interest rate. The "I" function he takes to be interest-elastic; he is logically compelled to do this, because at least one of these three functions must be interest-elastic. But in times of underemployment he fears that the "I" function has shifted so far to the left that even at a zero interest rate the volume of investment would be insufficient to restore full employment. This is the "Fellner impasse."⁶ Deficit spending alone — without monetary expansion — cannot break through it. Because the "L" function is inelastic, increased demand for transactions balances will raise the rate of interest until an equal amount of private investment is discouraged. Monetary expansion alone cannot break through it. The rate of interest will fall, but even if it falls to zero it will not stimulate enough investment to bring full employment. The only escape Professor Fellner can find is the combination of

⁴ Berkeley, University of California Press, 1946. Only Part Three, pp. 137-235, is considered here, and in particular Chapters V and VI. This excellent book covers a wide range of other topics.

⁵ P. 183 and pp. 200-6.

⁶ Pp. 180-86.

fiscal and monetary expansion which is his chief recommendation.

The "Fellner impasse" is a position of disequilibrium. The supply of money exceeds the demand. Equality of the money supply and demand is supposed to be restored, after an increase in the supply, by an increase in the demand for idle balances due to a reduction in the interest rate or by an increase in requirements for working balances due to an expansion of money income. Professor Fellner permits neither of these equilibrating factors to operate. There is no increase in demand for idle balances because the "L" function is perfectly inelastic. There is little increase in the requirements for working balances because the "I" function is insufficiently elastic. The pertinent question to ask Professor Fellner at this point is: Why does not the excess supply of money drive the interest rate down far enough — to zero or below if necessary — to stimulate sufficient investment to absorb the excess money into working balances? This is the way out of the impasse which his own theory indicates, provided he sticks to the bitter end with the assumption that the "L" function is inelastic. The implausibility of that assumption could not be better dramatized. For surely at zero interest rates no one would be willing to hold securities rather than idle money balances. As the interest rate approached zero, more and more securities would be sold. In other words, the demand for cash balances would become elastic.

If it is admitted that the rate of interest cannot, for these reasons, fall to zero no matter how much money is poured into the system, then the postulate that the "L" function is perfectly inelastic has been discarded in favor of the Keynesian doctrine that at low positive rates the demand for cash balances approaches perfect elasticity. The "Fellner impasse" becomes the "Keynesian impasse," case (C) in Table 1. The "Keynesian impasse" is, unlike the Fellner version, a position of equilibrium; the demand for money is equal to the supply because at the minimum rate of interest an indefinite amount of cash will be held in idle balances. The "Keynesian impasse" can of course be escaped by deficit spending, with or without monetary expansion.

If Professor Fellner sticks to the assumption that the demand for cash balances is interest-inelastic, his "impasse" can be avoided simply by expanding the quantity of money. He cannot then stick to his conclusion that monetary expansion will be unsuccessful in raising the national income. If he abandons the assumption, the way out of his "impasse" is deficit spending, whether or not it is accompanied by monetary expansion. He cannot, in this case, maintain that deficit spending, unless it is financed by the central bank, will fail to increase national income.

Professor Fellner is led into this dilemma by his theory of interest.⁷ Just as his "impasse" is a condition of disequilibrium, his theory does not determine an equilibrium rate of interest. The interest rate, in his theory, is determined by the equation of the demand and supply of loanable funds. The demand schedule is the sum of the "I" function, which is interest-elastic, and the "L" function, which is interest-inelastic. The supply schedule is the sum of the "S" function, current saving, and "M", new money, both of which are taken as interest-inelastic. The interest rate is determined, then, by the condition that $I + L = S + M$.⁸ This is not a sufficient condition for equilibrium of the system or of the interest rate. Equilibrium requires the additional condition that $I = S$, (or, what amounts to the same thing, that $L = M$). So long as this condition is not satisfied also, the level of income will change. Change in the level of income will influence at least two of the determinants of the interest rate: saving (S) and the demand for additional cash balances (L), and therefore change the interest rate.

On Professor Fellner's assumptions, the equilibrium interest rate would be determined as shown in Chart 1. In part A of Chart 1, S and L are represented as functions of income (Y). New money (M) is given by the decisions of the monetary authority. The level of income Y_0 is determined by the equality of L and M_0 ; it must be such a level that all the new money is absorbed into new working balances. At income Y_0 , an amount S_0 will be saved. In part B of Chart 1, S_0 is shown, and I gives the schedule of investment with respect to

⁷ Chapter V, especially pp. 140-52 and 166-73.

⁸ Pp. 168-71. Figure 22, p. 170.

the interest rate. The interest rate i_0 is determined by $I = S_0$. This presentation makes it clear that any level of Y can be achieved by creating enough new money. Professor Fellner's "impasse" arises when the amount of saving — e.g., S_1 from income Y_1 based on new money

the assumption that the "L" function is perfectly inelastic with respect to the interest rate and, indeed, attributing to the "L" function perfect or near perfect interest-elasticity at very low rates.

Professor Fellner's reasons for believing that the "L" function is inelastic with respect to the interest rate follow:

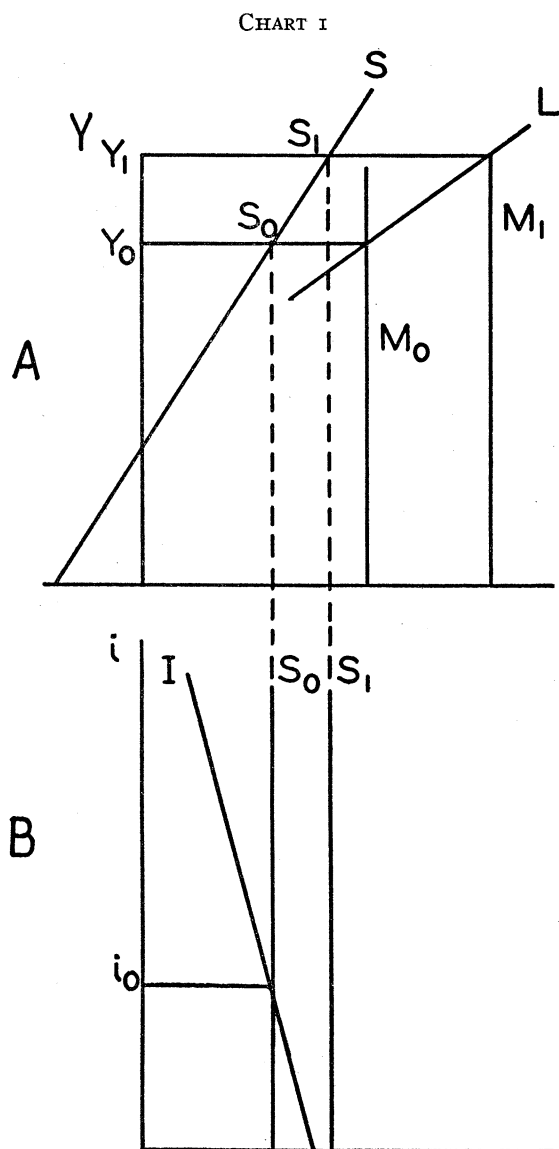
1) In Keynesian theory, the reason given for the high (negative) elasticity of the demand for money at low rates of interest is that "speculators" believe that the rate of interest will rise and therefore prefer to hold cash rather than securities. According to Fellner, "it is not convincing to argue that the expectation of a 'return to normalcy' of interest rates produces substantially increased hoarding at lower-than-normal rates. If the expectation of a return to normalcy is strong enough to produce significant phenomena it is likely to produce a recovery to previous levels of the main economic variables . . ." ⁹

2) Therefore, idle balances should be regarded as being mainly contingency (or precautionary) balances rather than speculative balances. But contingency balances, according to the *communis opinio* of economists including Keynes, are insensitive to interest rate changes. ¹⁰

3) "Moreover, the occurrence of (unfavorable) contingencies itself may appear to be more probable if interest rates rise, and it may appear to be less probable if interest rates decline, because interest rates enter into the costs of enterprise. Consequently, it is not only true that the interest elasticity of contingency hoarding is likely to be small, but the algebraic sign of this elasticity could sometimes even be 'inverse'." ¹¹

These points will be discussed in turn:

1) It is true that Keynesian theory emphasizes "that the demand for liquidity rises when interest rates decline because (1) the likelihood of a rise in interest rates . . . increases; and (2) at the same time, the compensation for bearing the risk of declining capital values is reduced." ¹² Professor Fellner finds the first



M_1 — exceeds the amount of investment which will be forthcoming even at zero interest rates. Here, on Professor Fellner's assumptions concerning the functions, equilibrium requires a negative interest rate. The failure of monetary policy to produce zero and negative interest rates can be explained only by departing from

⁹ P. 149.

¹⁰ Pp. 146-51.

¹¹ P. 148.

¹² P. 141.

of these two reasons unconvincing. But either one of them alone is sufficient to justify an "L" function of negative elasticity and of high elasticity at low interest rates. Even if the risk of a rise in interest rates is no greater at low rates than at high, the compensation for bearing that risk approaches zero as the interest rate declines. Keynes, it is true, emphasizes strongly the increased liquidity preference of speculators at interest rates below what they consider normal and safe. Their psychology in this regard is quite compatible with the holding by a different set of individuals of pessimistic views concerning the profitability of real investment. But the case for a highly elastic "L" function at low interest rates does not depend on that psychology.

2) Keynes included precautionary balances in his M_1 (working balances), dependent not on the interest rate but on income. Professor Fellner correctly points out that precautionary balances have more in common with speculative balances (Keynes' M_2). For if there were no uncertainty in regard to future interest rates, contingency reserves would be held in interest-bearing assets rather than in cash. So long as there is a possibility of a rise in interest rates, even though such a rise is not expected more strongly than a fall, the interest rate is a relevant factor in determining the allocation of contingency reserves between cash and securities. Some skepticism is justified, therefore, regarding the *communis opinio* of economists that the demand for contingency cash balances is inelastic with respect to the interest rate. The effect of the reduction in the compensation for illiquidity applies here just as in the case of speculative balances. In addition, individuals or firms holding contingency reserves differ from speculators in their attitude toward risk; in the case of contingency reserves, the disutility of the chance of a loss from a rise in interest rates is more likely to overbalance the utility of the chance of an equal capital gain. Even if the holder of a contingency reserve views a rise and fall in interest rates as equally likely, the chance of a rise may impress him more seriously. The lower the interest rate, the smaller the rise in it which will decrease the capital value of an asset enough to wipe out the yield. Uncertainty concerning the future

of interest rates, whether or not a rise is considered more probable than a fall, is sufficient to make the risk of illiquidity seem greater the lower the rate.

3) Professor Fellner's ingenious argument for an inverse relationship between the demand for money and the rate of interest relies on the effects of higher interest rates as higher costs to the entrepreneur. The reasons for doubting that interest is a significant factor in cost calculations are familiar from discussions of the role of the interest rate in investment decisions.

IV. RELATIONSHIP OF "IDLE" BALANCES TO SHORT-TERM INTEREST RATE, 1922-45

Theories cannot be proved or disproved by statistics, but the statistical evidence at least suggests that the demand for cash balances is not perfectly inelastic with respect to the interest rate. In an attempt to discover the statistical relationship between idle deposits and

CHART 2. — RELATIONSHIP BETWEEN AVERAGE "IDLE" DEPOSITS AND AVERAGE COMMERCIAL PAPER RATE, ALL COMMERCIAL BANKS, 1922-41

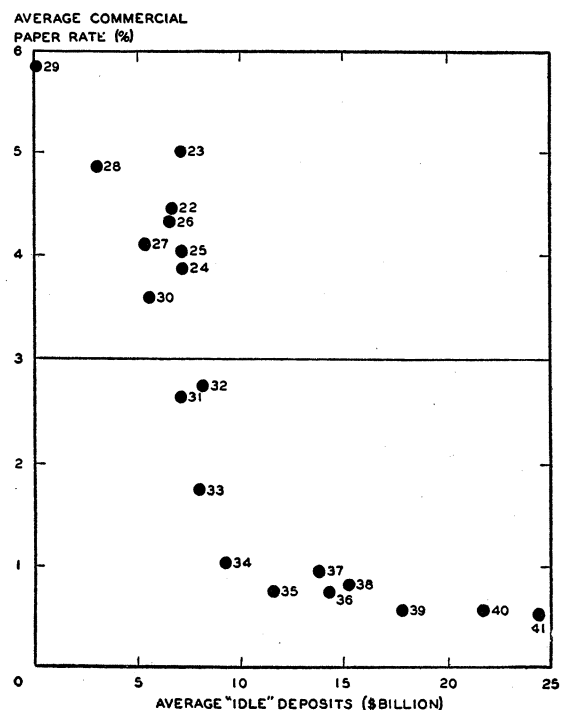


CHART 3.—RELATIONSHIP BETWEEN AVERAGE "IDLE" DEPOSITS AND AVERAGE COMMERCIAL PAPER RATE, NEW YORK CITY BANKS, 1922-45

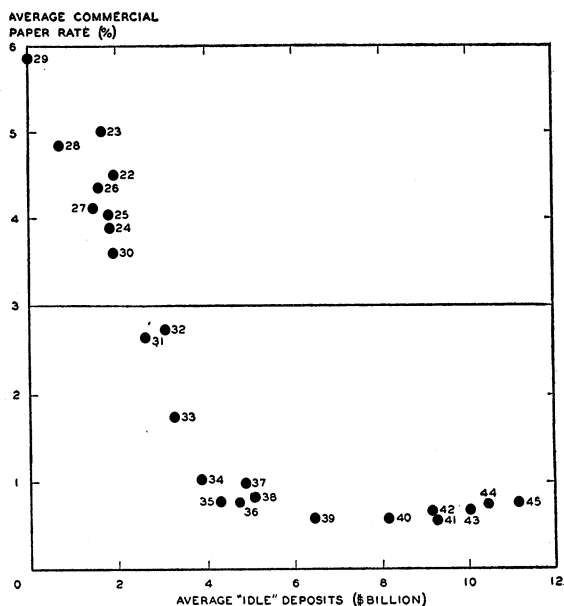
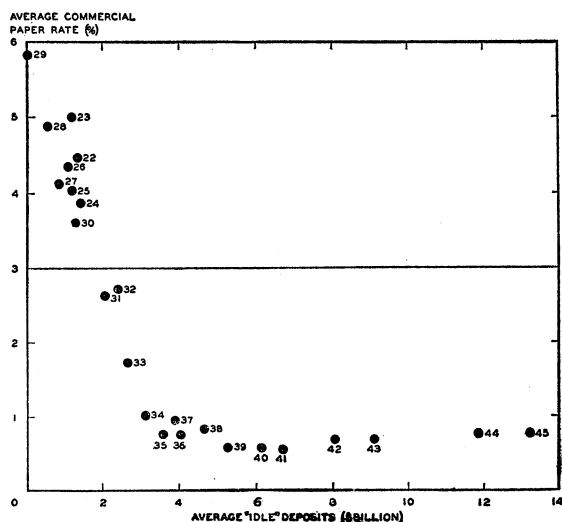


CHART 4.—RELATIONSHIP BETWEEN AVERAGE "IDLE" DEPOSITS AND AVERAGE COMMERCIAL PAPER RATE, BANKS IN 100 CENTERS OUTSIDE NEW YORK CITY, 1922-45



the short-term interest rate, estimates of average "idle" deposits were computed for every year from 1922 to 1941 inclusive, and for subsequent years where comparable figures were available. Separate calculations were made for all commercial banks, for New York City banks only, for banks in 100 centers outside New York, and for Chicago banks only. In all cases the highest transactions velocity of deposits occurred in 1929.¹³ To estimate the deposits in each year required for transactions purposes, total debits to demand deposits for each year were divided by the 1929 velocity. The result was subtracted from the actual average demand deposits for the year to obtain "idle" deposits, money which was not necessary to support the volume of transactions. This procedure results in arbitrarily defining "idle" deposits for 1929 as zero. Average "idle" deposits so computed are plotted against the average rate on prime commercial paper in Charts 2-5. The simple relationships shown can, on the whole, be improved by elimination

¹³ Board of Governors of the Federal Reserve System, *Banking and Monetary Statistics* (1943), Table 55, p. 254.

of a downward secular trend in the commercial paper rate, but this has not been done. Even without such improvement, the relationships are of the general form postulated by liquidity preference theory.¹⁴

¹⁴ The same conclusions can be reached by direct correlation of the transactions velocity with the short-term rate of interest. This has been done for English statistics by Kalcicki, "The Short-Term Rate of Interest and the Velocity of Cash Circulation," this REVIEW, XXIII (1941), p. 97.

CHART 5.—RELATIONSHIP BETWEEN AVERAGE "IDLE" DEPOSITS AND AVERAGE COMMERCIAL PAPER RATE, CHICAGO BANKS, 1922-44

