

AN APPRAISAL OF THE LIQUIDITY
PREFERENCE THEORY

by

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CHAPTER I

INTRODUCTION

Since the publication of Keynes' General Theory, the subjects of liquidity and of liquidity preference have been extensively discussed in economic literature. Among the writers, the names of Harrod, Robertson, and Hicks are perhaps best known. However, the subject remains a controversial one. In particular, the degree to which interest is determined by liquidity factors is disputed, with Hicks taking a favorable position¹ and Robertson a dissenting one.² Harrod has discussed liquidity preference and other doctrines as alternatives among which he is apparently not completely willing to choose, since he says, "I am not prepared to reject Keynes' theory, even in the stripped form in which his critics present it, as untenable."³

No attempt is made in this study to settle the fundamental dispute regarding the nature of interest. But an attempt is made to deal rather

¹J. R. Hicks: "A Suggestion for Simplifying the Theory of Money," Economica, 2 (1935).

J. R. Hicks: "Mr. Keynes and the Classics," Econometrica, 5 (1937).

²D. H. Robertson: "Mr. Keynes and the Rate of Interest," in Essays in Monetary Theory, London, King, 1940.

D. H. Robertson: "Some Notes on the Theory of Interest," in Utility and All That, London, MacMillan, 1952.

³R. Harrod: Towards a Dynamic Economics, London, MacMillan, 1948.

systematically with a part of the problem. One of the difficulties in Keynes and in other monetary discussions is that the motives of holding cash are mixed rather indiscriminately, under the heading of demand for money. The transactions demand as a relatively stable percentage of the transactions effected has been studied by Irving Fisher¹ and by Keynes himself,² in rather different ways. Although the question is logically clear, many technical problems arise as to the basis of reference, the transactions involved, the velocity of money, the different prices, etc. The speculative demand, in the Keynesian sense, mixes up the safety and the speculative features of money. Moreover, the speculative demand is not recognized as an important factor by several writers. More generally, no definite distinction between the two demands for money is possible in practice and they are only two extremes of the demand for money which combines transactions, precautionary and speculative desires. As Marget points out,³ the store of value function of money is part of its exchange function, and vice-versa. "Hoarding money is nothing but the custom of holding a greater stock of it than is usual with other economic agents, at other times or in other places."⁴

Thus the first aim of this study is to consider the motives of holding cash rather systematically by isolating certain ideal cases where the motive can be sharply distinguished. Following this, we shall con-

¹I. Fisher: The Purchasing Power of Money, New York, MacMillan, 1925.

²J. M. Keynes: Treatise on Money, London, MacMillan, 1932, especially Chapters 9 and 10.

³A. W. Marget: Theory of Prices, New York, Prentice-Hall, 1938, especially Chapters 16, 17, and 18.

⁴L. Von Mises, quoted in Marget, op. cit., p. 465 note.

sider some of the social implications of liquidity. Then relationships between this study and similar conceptions of various writers, particularly Keynes and Bronfenbrenner, will be stressed. Finally, some empirical data on money balances and interest rates will be examined.

The first case which we shall consider in the succeeding chapter is the choice that an individual makes when he is holding an asset or store of value for a known length of time. The investor has only choices of riskless investments in so far as returns are concerned. These provisions considerably simplify the problem and it is possible to show quite clearly that the individual choice depends upon the anticipations regarding the future values of assets. This choice is based on an appraisal of risks and the choosers of cash are (1) those who are seeking safety, and who wish to avoid any risk concerning the future values of the asset chosen, and (2) those who are seeking maximum gain with risk and expect the future values of alternative assets to fall enough to justify the holding of cash. In all cases, choice of cash contributes to the long-run income desire of individuals. Avoiding risk, an individual subjectively maximizes his income, because he is sure not to meet losses. Seeking risk, and money for that risk, an individual also maximizes his subjective income. Finally, a third motive for holding cash may be found in the building of reserves in order to meet emergencies, unforeseen conditions or foreseen future obligations, before the time of liquidation, which is known. Thus, it becomes apparent that the demand for cash can not be reduced to a single motivation basis. Following this, we shall examine the market implications of many individuals making such choices, pointing out that it is necessary to have differences in opinion.

In a second case, we shall consider the liquidity implications of different maturities. Since the shorter the maturity, the greater the

liquidity, short-term interest rates, which represent values, may in certain periods be higher than long-term interest rates, although liquidity preference on the part of investors generally prevents this from happening. Liquidity implications on the supply of securities of different maturities will also be examined.

The third case is that of assets with risky returns, and particularly with risk of default. Such risks generally increase the demand for cash. An attempt will be made to consider the real implications of liquidity and the liquidity properties of real goods as different from intangibles.

In a last case, unknown times of liquidation are examined. On one hand, the possibility of liquidating an asset at any time is desirable and reduces the holding of cash in order to meet calamities or unforeseen events. For this reason, these last causes of uncertainty can be offset by some institutional device, such as insurance. On the other hand, the possibility of a future value lower than the present price is greater for unknown times of liquidation than for a given liquidation time. Thus, uncertainties regarding liquidation generally increase the liquidity desire.

Is such a liquidity useful for the society as a whole? An excessive desire to hoard has long been criticized on moral grounds. The Church, social reformers, socialists, and Marxists have always been opposed to excessive hoarding. More recently, especially on the initiative of Keynes, hoarding has been challenged on purely economic grounds. Keeping prices down and curtailing demand, it creates and aggravates unemployment. Moreover, changes in liquidity preference are a cause of instability in the economy. However, one can say in favor of liquidity that it stabilizes interest rates, favors lending and borrowing, and

prevents unreasonable investments.

Such an inquiry is not original, as has already been stated. Keynes bases Book IV of the General Theory on a discussion of liquidity preference, which is one of the central mechanisms of his economic system. Although he is not always very clear, the transactions demand corresponds to $M_1 = L_1(Y)$ and the speculative demand to $M_2 = L_2(r)$. However, many points of the Keynesian liquidity preference are not altogether clear. Keynes grants too much importance to the question of speculation, in the sense of gambling. More generally, he mixes up the desire for holding assets and the desire for holding cash and gives two different definitions of liquidity, the first based on price certainty, the second, more consistent with his conception, in terms of price uncertainty. Thinking primarily in terms of deflation, he is led to charge liquidity preference with all evil.

Several economists, outside Keynes, have also been interested in the question of liquidity. After presenting the theories of banking liquidity and of J. Marschak, we analyse Bronfenbrenner's conception. His attempt to explain liquidity in terms of utility fails to be convincing and he develops an argument more adapted to capital gains of all assets than to liquidity with its two features, certainty and uncertainty in money prices.

Finally, an attempt is made to illustrate different points of this inquiry, particularly those concerning the desire for liquidity and its manifestations, with a presentation of cash balances and interest rates in the United States since 1890. While in the first decades of this century, the liquidity demand for cash balances was not considerable and the short-term interest rate was significantly above the long-term rate,

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meaning a preference of investors for long-term and of borrowers for short-term, in the 1920's liquidity preference resulted in an important amount of cash balances, due to speculation on future rises in interest rates; at the same time, short-term interest rates fell to the level of long-term interest rates. During the pre-war period, risk aversion, accentuated by the crisis of the 1930's, caused investors to hold large cash balances and resulted in a short-term interest rate much lower than the long-term rate. After World War II however, it seems that speculative and risk aversion motives for liquidity declined in importance while a new motive, institutional in nature, arose. Although cash balances are declining and interest rates increasing, the level of cash balance remains relatively high.

CHAPTER II

THE INVESTOR'S DEMAND FOR LIQUIDITY

The discussion of liquidity generally involves a number of different ideas concerning the holding of assets. People are interested primarily in one question: what will be the future of an asset? They anticipate not only the future value of the asset, but also different conditions or circumstances, some concerning more or less directly the holding of the asset, others completely outside the investing process. Such an anticipation is always made at a time at which the individual or firm has a decision to make about the form of assets. It determines the policy of an investor. Then, in a discussion concerning the form of holding assets, one is uniquely concerned with "ex-ante" characteristics of assets. However, the results of these policies are not irrelevant. One investor uses "ex-post" characteristics of assets and deduces from them what the future characteristics will be. So does the general public, whose anticipations create the demand function for the asset. An investor bases his policy upon the "ex-post" characteristics of the asset unless he has a good reason to believe in a change.

In a general way, the liquidity of an asset involves its property of store of value. And one of the qualities of money is its store of value characteristic.¹ The relation of money to liquidity has often been

¹Mr. Modigliani proposes to distinguish sharply between moneyness and liquidity, refining moneyness to the property of medium of exchange and

emphasized. The term liquid funds, is often synonymous with cash balances. Money is the liquid asset "par excellence," and liquidity generally refers to cash or assets with close relation to cash in the sense that their value in sale is closely confined in terms of cash. The trouble with such a conception is that it is asymmetrical in its position regarding the value of money. In a potentially deflationary situation, nearness to money, and money, are highly desirable, while in a potentially inflationary situation, they are relatively undesirable. It is clear, moreover, that liquidity, so defined, may or may not be desirable, since cash is not always a good store of value, particularly in times of inflation or of profitable investment opportunities.

The form in which assets are held must be related to the purpose for which assets are held. In determining the purpose for which an asset is held by an individual or firm, it may be useful to distinguish between the long-run and the short-run.

In the long-run, there is one purpose of holding an asset or a changing pattern of assets, namely achieving a maximum income. Only productive assets are sought in the long-run and yields or profits are supposed to be important enough to take care of other purposes, if any. Moreover, the uncertainty, in a long-run period is too large for people to be concerned with anything but income. The uncertainty is such that it doesn't allow for precise planning of the future. The period relevant to a discussion concerning an investor's policy and his choice between

keeping the term liquidity for the property of store of value. Medigliani: "Liquidity Preference and the Theory of Interest and Money," Econometrica, 12 (1944) 85. Such a sharp distinction may be unnecessary, due to the frequent overlapping of these properties.

alternative holdings is the short-run. Concerning the choice between assets, the kind of short-run involved here is the anticipatory future. When the future is foreseeable in a more or less precise way, when more or less precise anticipations about the future of assets are allowed, then one can make a choice between assets according to their qualities. However, this distinction between the long-run and an anticipatory future always remains rather vague, although its concept is easily understandable. It is impossible to refer to any particular period of time. Moreover, such a distinction apparently disappears when even the anticipatory future becomes very uncertain, as in the case of impending war or political trouble. In such a circumstance of very uncertain future, income and store of value properties are nearly meaningless, and intelligent discussion of rational behavior difficult at best.

Even in the foreseeable future, the income properties of an asset appear to be the principal reason for holding such an asset. People hold assets, first, because of the services rendered by the asset. The ownership of a car belongs to this category, namely real income. An asset has real income when it satisfies human wants. Human wants may well be purely social; prestige is one of the most important reasons for holding assets. The ownership of a fine car, for example, comes more from the desire for social prestige than from the need for transportation, which could be provided by an ordinary car. In the second place, people hold assets because they yield a monetary income. The holding of a machine, or a plant, belongs to that category, as well as the holding of securities. Ultimately, however, only real income gives utility to an asset. Monetary income appears to be only a factor derived from real income. The ownership of a shoe factory provides a monetary income, but that monetary income is derived from the real income produced by the shoes, which satisfy

consumers' wants. From another point of view, income includes both yield and capital gain, the former being something that can be taken out of the asset, the latter inherent in the asset itself.

Finally, the purpose of maximizing income can be attempted by all agents of the economy. An income may be that of an individual, a family, a firm, even a government. A discussion of different aspects of the choice among assets will follow.

Ultimately, in the long-run, an investor always tries to maximize his income. Such a maximization, in the short-run, can involve purposes other than a short-run maximization of income. The maximizing process, in the short-run, leads to holding assets for the following reasons:

- (1) Income from assets held at any time.
- (2) Improvement in income by changing the form of assets in the future.
- (3) Emergencies and unforeseen conditions.
- (4) Time shape of consumption demand, if known.
- (5) Maturity of obligations, debts, taxes and the like.

In the short-run these are the purposes of holding assets. They correspond to a long-run maximization of income.

Other things being equal, one always wants the highest possible income from assets, if possible ultimate liquidation of the asset and expenditure of the proceeds are included in income. The question of holding real income assets in order to satisfy the consumer's wants of the investor can be given in terms of money. A house, for example, will be considered because unless the investor holds such real estate, he would have to pay rent. But most of the assets held for consumption purposes, clothes, etc., will not be considered. A dividing line may be drawn between assets that can be sold, after partial use, by an

individual, and those without possibility of resale. A certain vagueness, then, remains attached to that concept of income, a vagueness impossible to remove without a complete explanation of economic utility, which will not be attempted here. Only assets which are held without the primary purpose of satisfying direct consumption will be considered.

Maximization of income from assets held appears to be a well known law of economic activity and doesn't need further development. The holding of securities, of stocks up to a certain point, or of real property, such as buildings, belong to that category. But at the same time, an investor wants a certain flexibility in his assets. When better opportunities in the field of investment occur, an investor generally wants to be able to change the form of his assets. In a way, an investor tries to avoid immobilization of his funds in case he finds either investments with a better real income or investments with a preferable monetary income. Holding securities with an organized market, or more generally, holding any asset which can be shifted to another investor, belongs to that category.

An investor also seeks some assets which can be sold quickly. The existence of an organized market is not enough. The process of liquidation ought to be quick in order for the individual to be provided with funds any time unforeseen circumstances, such as calamities, fire, etc., require them. The rapidity of the liquidating process is not the only relevant factor. A forced liquidation, due to circumstances, should not involve a great loss. In a general way, the quicker the liquidation period, the greater the loss involved. If a firm has to sell a plant in a month or so, it might find acceptable conditions, due to a competition between prospective buyers. If the same firm has to sell the same

plant in a week or so, it is obliged to take the conditions of the first prospective buyer and these conditions are likely to involve a greater loss. The same thing is true with used cars. The selling price of a used car is likely to be higher if the seller is not pressed to sell his car in a very short time.

Assets held must be adapted to changes in the shape of consumption habits, if foreseen. This element in the choice of assets is similar to those described above and makes for a certain flexibility in the form of the assets held. The same is true for firms; forecasting an increased dividend demand, a firm must be provided with assets which allow the distribution of that increase in dividend. The search for a car with a good trade-in value, in order to be able to get a newer model with a lower loss in the future, belongs to that category.

Last, such circumstances as maturity of an obligation, taxes to be paid, etc., require holding of assets. Generally, any foreseeable obligation in the future requires holding of assets in order to meet it at maturity.

In a sense, conditions (2) and (3) make for the holding of assets which are able to meet unforeseen events, while conditions (4) and (5) make for holding assets in order to meet foreseen obligations.

It is clear that in the long-run, all these aspects have to be included into (1). If we discard the holding of assets in order to meet the consumption demand of the holder himself, or at least the holding of those assets which have not an income easily convertible in terms of money, the monetary income provided by the assets should be sufficient to provide funds for such circumstances when needed. This is especially true of assets which provide monetary yields, and applies to a lesser degree to assets with capital gain. In the long-run, the income earned

by a firm should cover not only all the costs, but also reserves for risk and unforeseen circumstances, depreciation and possibly a minimum normal profit. However, we disregard in the long-run how the costs and receipts are distributed in time. It is the adaptation, in the short-run, of costs and receipts in time that requires the holding of assets for other purposes than income.

In the short-run, assets held for these different purposes contribute to maximizing the long-run income of the investor, individual or firm. Aspect (1), namely maximizing short-run income, contributes, of course, to long-run income maximization. It is easy to understand also how aspect (2), namely manoeuvrability, makes for maximization of long-run income by always taking the commitments providing the higher income. In holding assets for purpose (3), to meet emergencies, in the short-run one investor avoids the necessity of selling, in case of emergencies, assets with high future income potentialities for a price that actually can be disadvantageous to him. If an investor has to sell, quickly and at the actual market price, preferred stock which he anticipates to be a good long-run investment, in order to pay the doctor's bill, he has made a wrong repartition of his assets and is not maximizing his long-run income. A fortiori, the same is true when circumstances can be foreseen.¹ Holding assets for these particular purposes, then, contributes to a long-run maximization of income.

In the short-run, however, the relation to income is not nearly as clear. Item (1) is simply the maximization of short-run income; such a

¹Actually the sale of income yielding assets in order to meet foreseen or unforeseen obligations may not involve a loss. This is particularly true with capital gain assets and the obligation may mature at the same time as the highest capital gain of the asset. But such correlation can not be counted upon and is merely a question of luck.

maximization is very simply related to liquidity as defined on page 8. If one were to choose, once and for all, the form in which to hold assets and enjoy such income as they provide, he would never hold cash or cash-related assets. Cash yields no income. Cash-related assets yield only a small income, such as interest on time deposits, one per cent on time deposits payable in less than ninety days. He might choose, however, relatively low income safe assets or higher income risky assets according to his temperament and his faith in his ability to forecast yields. Some prefer risky situations, others avoid them, but in any case, selling value and liquidity would not be involved in purpose (1).

The other four items give rise, individually and collectively to a liquidity factor. And generally one has to give up part of the income in order to get liquidity. The relevancy of these four purposes to liquidity will be considered in some illustrative cases.

The first case involves the addition, to the once and for all selection of an asset, of the problem of a possible liquidation at a given time in the future.

Case 1: One Time-One Alternative Selection

In this case an individual is considering the choice between cash and an alternative income-earning asset.

In order to make this first case simple, some assumptions will be made. The income-earning asset may be a security or real property such as a building. It will be assumed that it is held strictly because of its possibility of earning a monetary income.¹ If the alternative asset is a

¹It would be sufficient to assume that the asset gives a certain amount of utility, either real or monetary, but a monetary yield renders the discussion easier.

building, it will be considered as an investment and not as the residence of the investor. But the individual has only the choice between the asset and cash. Other alternative assets to cash will not be available to him. Other assets can exist and determine the rate of interest, but for one reason or another, he cannot be provided with them. Sometimes regulations create such situations; a trustee often has only a limited choice of assets, sometimes only the choice between money and U.S. Government securities. From another point of view, risk of default on securities, or more generally, the uncertainty of the income stream up to the time of liquidation, t , will be neglected. The yield of the asset is assumed to be certain and stable, say one dollar per year. It may be either perpetual or lasting at least till time t . Time t , finally, is the liquidation time of the asset. There is only one liquidation time, t , as there is only one purchase time, 0 . If the individual purchases the asset at time 0 , he has no other possibility than to keep it till its maturity, t .

Such limitations make this example apply to (2), (4), and (5) of the reasons for holding assets listed on page 10. If the only purpose that the investor wished to fulfill was the yield earned, (1), he would take the asset. If the asset was held for purpose (3), emergencies, the investor would never take the asset but would keep cash. The possibility of changing to a better income yielding asset, and the consideration of a possible change in the time shape of consumption and of maturity of known obligations are, then, more relevant to case (1) than income and emergency considerations.

Although the individual has only the choice between cash and the alternative asset, he is not compelled to invest all his available funds in the form of the asset. He can invest part of his funds in the form of the asset and keep the rest in cash.

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To determine the price demand function of an individual for the asset, the only problem confronting the investor is that of the liquidation value of the asset, of its future value at time t . The income is known. If the liquidation value were to be equal to, or above the purchase price, the investor would certainly prefer the alternative asset to cash. More precisely, he would prefer the asset as long as its value at time t is greater than the purchase price minus the income received between times 0 and t . The income received is compounded at some future interest rate, namely the smallest interest rate that is likely to occur between time 0 and time t . The investor is then certain to earn at least that interest rate in reinvesting the income earned by the asset. A further discussion of this minimum interest rate, i , may be useful. It is not necessary to assume a fixed value of i . The minimum interest rate, i , can change during the period considered. If t equals one year and the minimum interest rate is two per cent for three months and then increases to two and one half per cent, the returns during the first three months will be compounded for three months at two per cent and for the remaining nine months at two and one half per cent; the returns after the first three months will be compounded only at two and one half per cent.

If the individual prefers the asset to cash, the future value, A_t , of the asset at time t must be such as:

A_t greater than B_t

$$\text{Where } B_t = A_0 - \left[(1+i)^t + (1+i)^{t-1} + \dots + (1+i) \right]$$

A_0 is the present cost or the market value of the asset.

$$B_t = A_0 - \frac{(1+i)^{t+1} - (1+i)}{i}$$

Expanding the binomial expression to two terms, we get

$$B_t \sim A_0 - t - (t+1) \frac{t}{2} i$$

Let us assume that i , the minimum interest rate is also the interest earned by the alternative asset. Then one dollar per year will be the earning of an asset of market value A_0 . In the binomial expression, if i equals five per cent, for any period t less than forty, the expression involving i , namely $(t+1) \frac{t}{2} i$, is smaller than t . Consequently, for small periods of time, the compounded interest factor is not important.

If the interest rate, i , is five per cent, A_0 approximates twenty dollars. In that case, for $t = 10$, B_t is smaller than A_0 unless the interest rate changes by one hundred per cent. The changes in interest rates, which determine the actual value of the asset (if the common belief is that the interest rate will stabilize in the future), are not significant upon the demand of assets with a long maturity. On the other hand, for $t = 1$, a change of only five per cent in the interest rate may make B_t equal to A_0 . Therefore, a change in interest rate is a very significant factor upon the demand of an asset with a short period of liquidation.

On the other hand, if t is very short, the interest return is so small that it does not offset the cost of carrying out the transaction, even in the absence of uncertainty concerning the liquidation value of the asset. Costs of carrying out a transaction run relatively high for physical assets, while they are usually relatively low for cash or intangibles. However, transaction costs for money are in a way fixed and not proportional and therefore they prevent the investment of a small sum for a small period. Much of so-called "transactions" money is probably held under the form of cash for that particular reason.

If the investor has an amount, M , to invest, of which he devotes mM to hold cash and $M(1-m)$ to hold the asset, he has to make a judgment

concerning the future value A_t and its probability. This judgment involves the likelihood that A_t be greater than B_t and the willingness to take the risk that B_t be greater than A_t . Still considering only motives (1) and (2) for holding assets, we can say that the size of m (m greater than or equal to 0 and smaller than or equal to 1) depends upon the value A_0 , the probabilities of future values A_t , $p(A_t)$ and a subjective factor, R , namely the risk aversion of the investor.

$$m = D[A_0, p(A_t), R]$$

The case $m = 0$ is that of an individual who holds no cash, but invests all his funds. He will do it if for all A_t greater than B_t the estimated probability is sufficiently high to outweigh, with his risk aversion R , the probabilities of A_t being smaller than B_t . This will generally be the case for a t sufficiently large, since it is unlikely that A_t be smaller than B_t unless extreme fluctuations of the interest rate are anticipated. For small t , changes in interest rate of the size of the interest rate itself may be possible and introduce considerable risk. If the individual is not willing to accept the possibility of loss as willingly as the chances of gain, then m will be greater than 0.

The case $m = 1$ is that of cash hoarding. The individual either thinks A_t likely to be smaller than B_t or has a risk aversion that makes him avoid completely the asset. For a t sufficiently large, however, such behavior is likely to be rare.

It will be emphasized that there are two very different factors in the case $m = 1$, or more generally, in all cases in which m is high. Cash is held for two reasons. First, an investor prefers cash because he expects that A_t will be smaller than B_t in the future, i.e., when the anticipations that A_t be smaller than B_t outweigh those that A_t be greater

than B_t . Such a motivating factor can be called the speculative motive. But, secondly, there is another factor that can motivate the holding of a large amount of cash. This other factor is risk aversion. Even when an investor expects A_t to be higher than B_t , he may prefer cash because he does not want to take the risk. Such a motivating factor can be called the risk motive. Speculative and risk factors are not completely unrelated. The speculative factor is partly derived from the risk factor, since individuals who have a high risk aversion will tend to have higher anticipations that A_t will be smaller than B_t than those individuals with a bold mind. On the other hand, the risk aversion depends partly on the past speculations of the individual and their realizations. However, in order to avoid confusion as to the demand for cash, this speculative motive and this risk aversion motive should be distinguished. The demand for cash is, finally, inherently a combination of the bearish speculator and of the sheepish quasi-bull, who avoids risk even though he thinks A_t greater than B_t .

It is perfectly rational for an individual to invest only a part of his funds. The individual will invest a percentage $(1-m)$ of his funds M so that the marginal rate of substitution of cash to the asset be equal to one. The marginal utility of the asset corresponds to its future probable values $A_{t1}, A_{t2}, \dots, A_{tn}$, with the risk involved in each combination. The marginal utility of money is its value certainty and its value uncertainty. Investing only part of his funds, the investor minimizes his risk. If he invests only a small percentage, $(1-m)M$, he centralizes the final liquidation value near M and this will lower the range of possible results to an acceptable level.

Now we shall drop the assumption that the asset is held uniquely for

an income purpose, (1), and a speculative purpose, (2). Holdings in order to meet emergencies, expected changes in consumption or anticipated obligations will be considered. Generally, the maturity of an obligation to be paid by the investor or a change in his consumption habits does not occur at time t , but either before or after time t . If they are expected after time t , the problem is not changed and the former developments are unaffected. On the contrary, if they occur before time t , they cause an increase in the value of m since beside the risk aversion R , another factor is introduced, namely liquidity need in order to meet expected obligations. Since the individual can not get rid of the alternative asset before time t , an obligation (debt or tax or the like) maturing at time $t-1$ compels him to keep at least a certain amount of cash, m . He is obliged to do so even though he expects A_t to be greater than B_t . However, if the investor has a possibility of borrowing and if A_t is expected to be greater than B_t plus the cost of borrowing money in order to meet the obligation at its maturity, the investor may still choose to hold the asset and borrow to meet the maturing obligation. But generally speaking, the debt position of an individual (debts contracted in the past) leads to a large preference for cash. The holding of assets as a precaution against calamities or unforeseen circumstances also makes for a high value of m . This question will be developed more thoroughly in a later illustration.

The important problem remaining, regarding the demand function, D , concerns the formation of anticipations involving A_t . It is clear that the whole economic process is involved in the determination of the values which eventually come about. The particular view of this process by the individual serves to make up his mind about the choice between the asset and cash, if any. (This amount, m , can be determined by other factors

in the short-run.) But it is not easy to single out a particular individual. In fact, the anticipations of A_t that make the demand function are those of all the prospective buyers of the assets. The expectation of A_t by an individual, then, is a judgment about the behavior of the market more than a judgment about the properties of the asset.¹

As a background of all anticipations about the investing process, there exists a relation between all the values of A . This background relation between A_0, A_1, \dots, A_t is generally masked by particular and general anticipations of the actual moment. On the market as a whole, if there is any considerable amount of cash holdings A_0 should tend to be adjusted so that the marginal buyer (which might be everybody, due to splits in asset holdings) thinks that $A_t = B_t$. The marginal buyer expects $A_t = B_t \sim A_0 - t$ for a small t , (i.e., in neglecting the compound interest factor). Hence the marginal buyer, and the majority of the market, thinks that A_t will be smaller than A_0 . This corresponds to a general anticipation that the values A_0, A_1, \dots, A_t will fall in the order of $\frac{i}{A_0}$ per cent per year, i being the interest rate, or under another formulation, that interest rates will rise in the order of i per cent per year.

The actual determination of A_t in the future depends on the same factors which determine A_0 . In a way, A_0 is nothing but a discounted value of all future A_t anticipated by the market. If the yield one dollar per year is assumed to be perpetual, the process is never-ending and the values A_0 and A_t depend solely on the relationship between the yield and the interest rates, (both present and future). This is the case for

¹In fact, it is a judgment about what the prospective buyers actually think of the properties of an asset, particularly its future value A_t .

perpetual bond issues in Great Britain and in France. A somewhat similar case occurs in the United States for the preferred stock of well-established and reputed corporations, such as U.S. Steel or General Motors, whose maturity appears to be nearly perpetual. More generally we can distinguish four classes of factors in this process of discounting anticipations:

- (1) Supply of new assets
- (2) Demand for services of the asset, if any¹
- (3) Future investment demand and as a part of this:
- (4) Speculative appraisal of the value of existing assets which will exist in the future.

The question of the effect of anticipations on the value of assets introduces the whole economic process. The above categories of market forces are obviously far-reaching in their implications. Especially they imply not only expectations concerning the existing assets, but also involve the creation of new assets or the supply of newly-created assets. In a way, when one considers the future of an asset, and its future value, he anticipates that the supply of that asset will continue and presumably either increase or decrease. Only the demand for existing assets will be considered. Shifting from the individual's point of view to the group of individuals composing the market, we shall consider the market implications of the demand for existing assets and maintain the artificial assumption that all market operations consider a possible liquidation at the same moment, t , in the future, therefore avoiding the problem of maturities.

¹This does not affect the assumption made earlier that the investor himself does not use the real services of the asset.

First of all, it must be noted that the demand in question inherently implies differences of opinion among individuals as to the future values A_t . If everyone thought A_t greater than B_t , no one would want cash.¹ The speculative demand for cash is then zero. This is the case considered by classical economists in which cash is held only for a small t (transactions or income money). It is also the implication made by the quantity theory of money. Such a condition is not likely to occur, although it is not inconceivable. In a very dynamic country where technology changes are quick and where everyone is optimistic about the future development of the economy and willing to gamble, a situation approaching a zero demand for speculative money may develop. In the absence of supply of new assets, however, this zero demand for cash is unthinkable, since the demand for assets would probably increase to the point where speculative desire for cash would arise. Only in the case of a new supply keeping the price of the asset down and allowing an universal movement into the income-earning asset shall we have a zero demand for money with rather uniform anticipations regarding future events.² As stated, such uniformity is conceivable under very dynamic conditions, although rather unlikely.

On the other hand, if everyone believes A_t smaller than B_t , the demand for the alternative asset will be zero. This corresponds to a liquidity preference equal to one for all individuals. The absence of demand

¹We consider cash as an alternative form of holding assets. The question of transactions money is discarded in that discussion.

²This also implies a perfectly divisible income-earning asset. Those with small investable funds will then be provided with the asset and not obliged to keep cash. Another possibility fulfilling the same purpose is the existence of a savings association.

for the income-earning asset implies a complete and general lack of confidence in the economy. A liquidity preference approaching the unity may have been anticipated by the economists of the secular stagnation thesis, but a unity liquidity preference is nearly inconceivable unless complete uncertainty about the future exists. In such a circumstance money itself would probably be uncertain, and therefore lose its liquidity characteristics. Then gold would be the only asset worth holding. A liquidity preference equal to one is then quite unrealistic. At some price, part of the market will shift from money to the income-yielding asset, since the temperments and risk preference of individuals differ. In a word, this means the existence of differences in opinion under ruling conditions in the market.

If we accept the notion of market differences as normal, then a certain amount of cash held for speculative purposes will exist. A part of the money supply will be inherently devoted to asset speculation and transaction. Presumably, the flow of funds diverted from the general circuit of money to allow speculation and transaction on the asset market will have a velocity of its own. The velocity of money, then, will not depend solely upon the quantity of money, the amount of transactions arising from production activity, and the level of prices, as it is assumed in the quantity theory. (This is merely another way of saying that the quantity theory did not think of speculative holding of money.) Either due allowance to asset speculation is made in the computation of the velocity of money or a certain amount of cash is withdrawn from the total money supply in order to measure the velocity of money. The second method implies that the amount of money devoted to asset speculation can be singled out and is relatively stable. In fact, the velocity of the circulation of such speculative money is determined not so

much by the differences among individuals as to anticipations of future values, as by revisions of anticipations causing the individuals to readjust the asset holdings. This velocity is then highly variable and uncertain. It involves not only the present psychology of the market, but also the past expectations.

From what has been said it is clear that there is no difficulty in defining the liquidity preference of an individual. Under the ruling market conditions of any particular time, the amount of cash relative to the total value of assets owned is a measure of the individual's liquidity preference, m .¹ The value of m varies between zero and one. This measure should be fairly adequate as regards differences among individuals in liquidity preference at any one time. The chief difficulties are those of measuring the value of real assets, and of allowing for differences in liabilities between individuals.

For the market as a whole, changes in liquidity preference can be noted. Comparisons between times show such changes. However, they do not indicate the absolute liquidity preference of the market, if any. The natural relation, as suggested by Keynes, is to derive the market liquidity preference from the individuals' liquidity preferences. It consists in relating the total amount of cash held, to the total value of a fixed set of assets. In another formulation, it consists in relating the amount of cash held, to the current rate of return of assets, since, broadly speaking, the value of assets is derived from their rate of return. Such a measurement is satisfactory as long as the new supply of assets is neglected. But as noted above, page 22, the value of assets

This is merely saying that the liquidity preference m equals $\frac{mM}{(1-m)M+mM}$, i.e., a tautology.

(and their rate of return) depends on anticipations about the new supply of that type of asset. On the other hand, if it is admitted that such new supplies affect the returns of the asset, and by different amounts at different times, the definition of liquidity should reflect this.

In a general way, we may state that the market liquidity preference may be measured by the amount of cash devoted to asset speculation and transaction related to the total value of assets, plus a factor expressing the rate of change in the value of assets resulting from new supplies. Since it is impossible to single out the amount of money devoted to asset speculation and transactions, it is generally agreed to consider the total amount of cash in existence. Such a method can be justified by the fact that the amount of cash devoted to other purposes (transactions money) is proportional to the level of income and thus stable, given a certain level of income. (We neglect the effect of velocity of money, which can easily be included in this point.) Then:

$$L = \frac{M}{V + KV'}$$

where M represents the amount of money, V the value of assets other than money, and V' the rate of flow of new assets, K being a constant. If $K = 0$, the value of assets is inverse to the market rate of return, i:

$$L = M/i$$

This is the rectangular hyperbole corresponding, if we neglect the liquidity trap, to the Keynesian liquidity preference. This shape of function implies that a given liquidity preference means a constant ratio of cash to the value of other assets. A ten per cent increase in the quantity of money would then lower interest rates by ten per cent.

Finally, it should be noted that there are no long-run or secular effects of liquidity preference on interest rates and the value of assets. Historically speaking, the ratio of money to income has been amazingly

stable in time and seems to support, as regards the long-run, the classical view of absence of liquidity preference. In fact, the reason is that, for a liquidating time sufficiently large, the speculative holding of money is very unlikely. Conceivably if anticipations of rises in interest rates were general (although in different degrees among individuals), but continuously unfulfilled, i.e., if interest rates fell more or less continuously, then liquidity preference would be high and increasing, and this would prevent the interest rates from falling as much as they otherwise would. However, it is hard to conceive of such long-term discrepancies. Presumably, people will tend to revise their anticipations if the fall in interest rates has been long enough, and therefore bring the interest rates lower. More generally, in the long-run, liquidity preference can have an effect either stabilizing or erratic, since speculation in and out of cash has no long-run effects. As regards holding of assets, speculation in and out of cash may counterbalance the long-term changes by providing a supply of investment funds from time to time out of cash flows.

All the preceding developments have been concerned uniquely with assets and nothing has yet been said about liabilities. The relation between the demand for cash and the value of assets, stated above as the liquidity preference, applies only to individuals without liabilities or groups of individuals without lending and borrowing. Such a definition of liquidity preference should be expanded in the case of the existence of liabilities.

Debts are substitutes for liquidity. The possibility of borrowing means that an individual is able, for the present, to keep his income-yielding assets, deferring his obligations to the future. But on the

other hand, the existence of past debts to be repaid requires the holding of more liquid holdings. It is obvious, then, that the existence of debts affects the demand for cash but it is very difficult to know the real impact of debts.

For an individual, the existence of debts causes an increase in liquidity preference. But new liabilities inherently mean a desire for illiquidity. Then the possibility of borrowing and the desire to borrow, i.e., the anticipation of possible higher debts in the future, makes for a decrease in liquidity preference, other things being equal. Such an anticipation generally comes from an optimistic view of the future and a confidence in the betterment of individual income. It usually occurs at times when there is a preference for assets and a relatively low risk aversion.

For the market as a whole, the problem is rather complex, since debts cancel out. However, the following relations can be made: the higher the level of debts outstanding, the higher the demand for cash. On the other hand, the greater the willingness to expand credit, the lower the demand for cash. Therefore, the liquidity preference of the market, or the demand for cash, is affected both by the amount of credit and by the willingness to change this amount. A high level of credit, but a willingness to lower that level, due to uncertainty about the future (as happens at the very end of a boom), causes a higher demand for cash, other things being equal. On the other hand, a low level of credit and a desire to expand it decreases the demand for cash. Historically speaking, this last case has been a significant factor for a decreasing cash demand.

Then, in a definition of liquidity, due allowance should be made for the level of outstanding credit and the willingness to change that level.

The effect of debts outstanding and willingness to change their amount may be represented in a formula of liquidity by a factor which adjusts L to $\frac{M}{V+KV'}$, according to the level of debts. The formula then becomes:

$$L = \frac{CM}{V+KV'}$$

We may summarize case (1) as follows:

(1) If the choice is between two assets, cash and an income-yielding asset with known returns to be held until a known date in the future, an investor will prefer the earning asset unless the prospective loss in selling value more than offsets the income earned.

(2) Under given conditions of uncertainty as to the future value of assets, the greater the willingness of an individual to assume the risk of loss in return for a chance of gain, the greater his demand for the income-earning asset.

(3) The longer the time of liquidation, the greater the demand for the income-earning asset.

(4) The price established by market demand will normally be such that some investors hold some or all of their assets in cash while others maintain some or all of their assets in the alternative form.

(5) Liquidity preference can be measured as the ratio of cash held to the total value of other assets held, with due allowance for the effects of changing supply of assets and with consideration given to the question of credit and outstanding liabilities.

Case 2: Maturity Times

In case (1), the question of maturity was avoided since the income-yielding asset was supposed either to be perpetual or to have a maturity longer than the liquidation time, t . In this case, (2), we consider the existence of different maturities.

There are two possibilities consistent with the existence of different maturities for pay out periods. Different maturities can exist with one kind of income-earning asset, such as a bond. A bond can be short or long-term according to its maturity. In the second place, different maturities can involve, as will be assumed here, different kinds of assets. A rough classification of assets according to their maturity will be as follows: money with zero maturity; assets with finite maturity periods, short-term to long-term, such as notes, obligations, bonds, real estate, etc.; assets with infinite maturity, such as stock shares.¹ An important assumption in case (1) remains in case (2): only a known liquidation time, t , will be considered. The question of different liquidation times will be postponed until a further illustration. Therefore we shall consider as short-term the assets with a maturity shorter than t , and as long-term the assets with a maturity longer than t .

The existence of different maturities gives the investor the possibility of adjusting the time shape of his assets to the time shape of his liabilities, if known. Holding assets in order to meet a foreseen change

In fact, stock shares have a finite maturity. They last only as long as the corporation itself. However, well-established corporations, such as General Motors or U.S. Steel, have a nearly infinite maturity. Moreover, since in this study we are concerned with the short-run, it is an acceptable approximation to consider stock shares as perpetual.

in consumption habits or a known obligation (debt, tax or the like) before time t no longer requires the holding of cash but can be taken care of with short-term assets. More precisely, an individual investor will build a portfolio of assets whose maturity schedule corresponds to the maturity schedule of his anticipated payments. All individuals will probably do the same, but that does not establish any relationship between liquidity and maturity. Up to this point, maturity is merely a substitute for liquidity. Individuals will probably have different maturity schedules and there is nothing that makes one prefer a maturity to another. A possible exception would be a date at which many people need liquid funds at the same time, such as a fixed deadline to pay taxes. Other things being equal, there will be considerable desire for liquid funds just before that date while it will fall to nothing immediately after. In a way, the seasonal increase of money in circulation at certain dates, especially at the end of the year, corresponds to a phenomenon of that nature. The relation between maturity and liquidity comes from the needs for money corresponding to emergencies and to speculation on changes in interest rates. These are unforeseen events and make for preference for the shortest maturity, and, singularly, money whose maturity is equal to zero. The effect of these last motives for holding assets is to create the following relationship between maturity and liquidity: the shorter the maturity, the greater the liquidity.

Since expected future values are not the same for two assets of the same maturity, an investor always takes the asset with the highest possible B_t , other things being equal. The speculative choice between cash and an asset is then with the asset with the highest B_t .

Outside a repartition of the maturities of assets in order to meet foreseen obligations, the individual's portfolio will contain assets of

different maturities depending upon the amount of risk that the individual is willing to assume and his appraisal of the future values of longer-term securities. In this diversification of assets an individual somehow centralizes the future liquidation values of his assets near M . A diversification of assets corresponds then to a compromise between liquidity and income. Moreover, such a choice reflects the willingness of the individual to bear risk and the amount of his liabilities. As we have stated earlier, the larger the liabilities and the smaller the willingness to increase them, the higher the need for liquidity.

Finally, the effect of maturity is to give liquidity to an asset. Maturity is, then, a substitute for liquidity. The owner of a bond has more liquid potentialities than the owner of a stock share, other things being equal, i.e., yields being similar.

The repartition of assets according to maturities can be analysed both from the investor's point of view and from the supplier's point of view.

For the investor, short-maturing assets are substitutes for cash. Only two motives for holding assets will be considered, the income motive and the speculative motive. Holding assets for foreseen and unforeseen obligations will be neglected. When the value of A_t is expected to be smaller than B_t , it is preferable to avoid the long-term (greater than t) income-earning asset. In the absence of maturity, the investor holds cash. With the existence of short-term assets, he prefers to hold short-term assets. A further choice between very short-term assets and short-term assets with a maturity near t may be possible, in the expectation of a change in the short-term rate of interest. It will even be very significant for a t sufficiently large. On the contrary, for a small t ,

such a choice is negligible since it is impossible to anticipate that interest rates will rise and fall very fast, because such an anticipation prevents rises and falls. Then liquidity preference is no longer uniquely a preference for cash, it is a preference for shorter-term maturities. Those who hold cash speculatively will prefer all maturities smaller than t , and will have a decreasing preference for maturities greater than t . Thus, liquidity preference is reflected in a desire for shorter-term securities.

On the other hand, those who hold long-run assets are not affected. Individuals who expect A_t to be greater than B_t will prefer assets maturing at a time longer than t and presumably will prefer the longer-term assets to the assets maturing near t , unless they expect a change in interest rate shortly after time t . Therefore the holding of long-term assets will be unaffected by the existence of shorter-term assets. Such behavior is true only in the case of one liquidation date t . With unknown liquidation dates, the question is much more complex. As will be noted later, uncertain liquidation time increases the liquidity preference and causes some transfer from long-term to short-term assets. For the supplier or seller of debt instruments, the existence of liquidity is advantageous. In the absence of a liquidity preference greater on the part of investors than on the part of suppliers, maturities would serve no purpose. But liquidity preference on the part of investors is so large as to lower the interest rates. The possibilities of profit are then so high that it is always advantageous to issue liquid securities in order to immobilize in investments the funds received and make a yield higher than the return to pay on securities. A corporation issuing bonds is interested in immediate liquidity to be at once converted into an income-earning asset. Issuing bonds in order to meet a maturing debt

corresponds to the same motive of maximization of income: the liquidity provided by the issuing of the bonds allows the individual to keep his income-earning assets. By providing liquidities to be turned into income-earning assets, the issuing of bonds contributes to long-run income. A corporation never issues bonds in order to hold cash or liquid assets. Another reason why a corporation prefers maturing securities to stock shares is that they do not drain the corporation's future income in the expectation of an increasingly profitable future. (In a pessimistic situation, it is exactly the contrary.) Moreover, fixed-income assets are preferred by the issuing corporation if a period of inflation is anticipated (even in a long-run future). In a period of inflation, the bond has a fixed monetary value and a fixed return. Its market price tends to drop and the corporation is able to buy its own bonds on the market at a cost much lower than the maturity cost, therefore maximizing its income.

Generally speaking, short-term issues are rational from the supplier's point of view. The supplier of assets will issue long-term assets if he expects a higher rise in interest rates than the investors do. A corporation always issues long-term securities when it expects an increase in interest rates, but the effect of such an issue can be annihilated because investors expecting a rise in interest rates will prefer short-term securities. Another factor that makes for a preference for long-term securities, and probably the most important factor, is a desire for freedom from obligations in the near future. Future uncertainty makes for preference for long-term maturities. Issuing short-terms, a corporation has continually to pay out maturing obligations and issue new obligations. But the possibility of issuing new obligations depends on the amount of short-term credit at any time. In periods of crisis, such as the year 1932, there is

little possibility of credit and the corporation, becoming unable to borrow, has to resume its operations. Such moments of inability to borrow may be rare, but are definitive for the corporation depending on short-term when they happen. From another point of view, short-term borrowing depends more upon monetary policies than long-term borrowing. Many countries have experimented with some periods of quantitative credit control. In these periods, a corporation depending on short-term credit may be unable to borrow as much as it needs, due to the general tightening of short-term credit. This desire for freedom from obligations corresponds to a liquidity debt phenomenon. An investor feels a debt maturing in the near future, a liquid debt, more than a long-term debt, an illiquid debt. Finally, a last factor may occur that explains the preference for a long-term debt rather than a short-term one. Suppliers and investors have different liquidity desires, the former generally preferring short-term, the latter preferring long-term. An asymmetry in liquidity desire between suppliers and demanders may, then, create a premium on long-term rates that allows an arbitrage between the two rates. In part, banks and savings associations fill this arbitrage function by borrowing short-term and lending on a longer-term basis. German banks, in the 1920's, used the short-term English and American loans in order to rebuild German industry, depending solely on the continuation of the flow of international capital. Other arbitrage institutions can be conceived of, but generally such an arbitrage is very risky, as far as the solvency of the institution is concerned.

We may summarize the following preferences, which concern uniquely the speculative motive of holding assets:

- (1) Suppliers anticipating a rise in interest rates issue long-term;

suppliers anticipating a fall in interest rates issue short-term.

(2) Investors anticipating a rise in interest rates buy short-term; investors anticipating a fall in interest rates buy long-term.

Arbitrage operations are possible between long-term and short-term rates, depending upon the strength of market forces. Another question remains: Is it possible for the short-term interest rate to be higher than the long-term rate? With the assumption of only one liquidation date, t , this can happen. More specifically, when people expect a fall in interest rates, borrowers can expect more than investors, or lenders, thus the short-term rate will be pushed up higher than the long-term rate. Secondary factors such as the cost of reinvesting in short-term securities (such a cost is relatively fixed) and the advantages of flexibility in borrowing short-term, particularly for seasonal reasons, may also make short-term rates higher than long-term. In the eventuality of unknown and variable liquidation time, the same factors occur. However, the circumstances in which the short-term rate is higher than the long-term rate are likely to be rarer. Since, then, short and long-term securities are competitive and a definite separation between the short-term and the long-term does not exist, debts of different maturities make one pass gradually from the short-term to the long-term. The same factors that induce the short-term rate to rise higher than the long-term may simply result in lengthening the average maturity of all instruments of debt if they are not strong enough to make an individual change from long-term to short-term or reciprocally, but simply make him lengthen or shorten the maturity of debts or assets. However, when the factors described above are strong enough, short-term rates can and will be above long-term rates.

Finally, if it is thought that rates will rise, then level off,

short-term rates will generally be smaller than long-term rates, since borrowers will not desire to replace long-term debt by short-term debt if they anticipate a continuous debt (as business generally does), and investors will wait for better future rates. But if it is thought that the rise will be secular, this will not happen, for it is impossible for the market to continue to believe that short-term rates will always be below long-term rates; otherwise no one would borrow long-term. Therefore, short-term rates will become higher than long-term rates.

In conclusion, we can summarize the arguments as follows:

- (1) The shorter the maturity, the greater the liquidity.
- (2) Short-term securities are substitutes to cash and not to long-term securities.
- (3) The liquidity preference of investors is generally greater than that of suppliers; therefore, it is advantageous to supply short-term debt instruments.
- (4) Differences in anticipations between suppliers and investors make for a premium either on long-term or on short-term securities.
- (5) It is not impossible for the short-term rate to be higher than the long-term rate.

Case 3: Risk of Default or Yields Different Than Expected

In the third case, the primitive assumption of one time of liquidation, namely t , is maintained. But the yields of assets are no longer assumed. If the income stream of assets is uncertain, an investor has to make two different anticipations, the first concerning the future values of assets at time t , namely A_t , the second concerning the yields received between time 0 and time t , which we shall call $q_1, q_2, \dots, q_{t-1}, q_t$. Yields and values, however, are not independent but intrinsically related.

Just as the values of riskless assets were derived from interest rates,¹ the values of risky assets are derived from their yields. The risk involved here is that of yields different than expected. For the market as a whole, yields and values are adjusted according to the risk aversion of the market, (average of the risk anticipations of individual investors), if any. Then $A_0, A_1 \dots A_t$ depend on $q_0, q_1 \dots q_t$ and $q = i + r$, r being the risk factor (average of risk anticipations of investors). This adjustment of values to yields, or of yields to values is made according to the knowledge that the market has of the asset, since it is presumed that investors behave rationally. If the market has some sort of risk aversion, and presumably it has, the more uncertain the yields are, the lower are the series $A_0, A_1 \dots A_t$ and the higher the ratio $\frac{q}{A_0}$. If A_0 equals ten dollars and the yield expected is $q = \$2$, i.e. twenty per cent of A_0 , it is likely that the risk of loss or of yields lower than two dollars is large, since the factor r ($r = q - i$) is large. On the contrary, the more certain the yields are, the higher

¹Cf. case (1), p. 16 et seq.

are the series A_0, A_1, \dots, A_t and the lower the ratio $\frac{q}{A_0}$. At the limit, when the yield is riskless, as in the case of high-grade bonds and especially U.S. Government bonds, the value r is zero and $q = i$. We are back to case (1).

For an individual investor, the question is a little different. The risk aversion of an individual investor is generally not the same as that of the market. Then the individual reappraises q and A_t according to his own anticipations. If his risk aversion is different from that of the market, a gain or loss appears, resulting from the differences between q and A_t as he appraises them and q and A_t as the market appraises them. Moreover, the individual can have some special information as to the yields or future values which the market can not share, and that may also cause a difference between individual appreciation and market appreciation. However, since the same motivating factors apply to uncertainties concerning yields and to uncertainties concerning values, the same reasoning can be applied to both uncertainties.

The risk of default is one particular case of yields different than expected. It affects the choice between cash and assets in two different ways. First, it is part of the risk that A_t be smaller than B_t involved in the choice, since default payment means $A_t = 0$. From that point of view, it merely increases anticipations of A_t smaller than B_t . This is related to holding cash for speculative reasons (A_t smaller than B_t). A possible exception to this is an anticipated value $A_t = 0$; then the default is no longer a risk, since it is expected. This is the case for a value of t sufficiently long and an interest¹ sufficiently low for B_t

¹Or more precisely a yield, $q = i + r$, then $\frac{(q+i)^{t+1} - (q+i)}{1}$ greater than A_0 , but the reasoning is the same.

to be smaller or equal to 0, namely:

$$\frac{(1+i)^{t+1} - (1+i)}{i} \text{ greater than } A_0$$

Then, it is still preferable to hold the asset instead of cash, for speculative purposes, since A_t will be greater than B_t , A_t being equal to 0 and B_t being smaller than 0. It can be noted that for most goods held for their real properties such a case is usual; it merely implies that the asset is depreciating. Under these circumstances, the value $A_t = 0$ is not a risk, but discounted in the value A_0 .

In the second place, the risk of default, with the exception stated above, is likely to increase the risk aversion, R , of the investor. More specifically, when the risks of default are very rare, such as in periods of prosperity, the risk aversion of investors is likely to be relatively lower. On the contrary, when default payments become less unusual, the risk aversion increases relatively and the unwillingness to invest becomes characteristic. An illustration of this will be found in a later chapter. The anticipations of default are stronger in periods of crisis and depression than in periods of prosperity. During the 1930's, a large part of the unwillingness to invest may be attributed to a factor of this kind. Often there were prospects of A_t greater than B_t , because of a low B_t and of an inflationary monetary policy, but they did not result in dishoarding. When risk aversion is understood in a narrow way and defined strictly in terms of individual temperments,¹ the same problem can be explained in another formulation. The risk of default is then related to calamities and unforeseen circumstances. The risk of default merely increases the need for holding assets in order to meet calamities and unforeseen circumstances. The effect, however, is the same: preference for

¹Keynes: General Theory, p. 150.

liquid over income-yielding assets.

The general problem of yields different than expected is similar to that of default payment, with the difference that "ex-post" yields can be higher than anticipated yields. Yields different than expected result in a relation between A_t and B_t different than anticipated. The value A_t may be different than anticipated and the value B_t may also be different, since the factor $\frac{(q+i)^{t+1} - (q+i)}{i}$ is different than expected. The result, then, is to create unanticipated capital gains or losses. Since, presumably, the maximization of income corresponded to the repartition of assets according to the anticipations, these capital gains or losses result in a minimization of long-run income. A possible exception is a double error on both q and A_t , which compensate themselves, so that the relationship A_t and B_t is the same as expected, although both A_t and B_t are different than expected.

Unanticipated capital gains minimize the long-run income, or more precisely, do not maximize it. The individual investor, at time 0, distributes his assets according to his anticipations of A_t and q and to his risk aversion. He then maximizes his subjective long-run income. If the investor obtains an unexpected gain as a result of yields different than expected, he may be better off but his distribution of assets at time 0 was inadequate. If he had anticipated the possible gain at time 0 his distribution of assets would have been different and presumably he would have made, at time t , a higher final gain. Therefore, although it does not bring any loss, an unexpected yield resulting in a final gain corresponds to a minimization of income.

An exception to this scheme is the following: in a period of depression, an investor overestimates the risks of emergencies and unforeseen

circumstances and keeps a relatively liquid portfolio of assets. The unforeseen final gains of some assets make for a higher income and the individual realizes "ex-post" that he overestimated the risk of emergencies. He considers, then, that his distribution of assets at time 0 was inadequate and that the unexpected gains balanced his error.

When yields different than expected result in a capital loss, not only does the investor not maximize his income, he actually bears a loss. His lower income, furthermore, has no counterpart. He has not a higher liquidity as if he had purposely sacrificed some income for liquidity. The failure, then, is complete.

In the case of unanticipated yields, the risk is two to one against the investor. In addition to the risks involved in the anticipations of A_t and B_t , the investor has to bear the risk involved in yields. Most investors, even those with a relatively high risk preference, will hesitate to take such additional risks. Therefore, uncertainty as to yields generally increases the liquidity preference of investors. It is a liquidity preference of its own. The desire for debt instruments with fixed money obligations rather than equities arises partly from a liquidity preference of that kind, just as does the choice for securities rather than real assets. (Only, in this case, another factor is involved, namely a greater faith in the profit prospects of firms than in those of the investor himself going into business.)

However, liquidity preference of that special kind does not always make a preference for cash. Moreover, in an inflationary situation, it leads to an avoidance of cash.

In an inflation, the value \$1 at time 0 will be $\frac{\$1}{P}$ at time t , P being a weighted price index. The values of other assets will vary as

follows:

A_{10} at time 0 and A_{1t} at time t

A_{20} at time 0 and A_{2t} at time t

A_{n0} at time 0 and A_{nt} at time t

The price index, finally, is equal to:

$$P = \frac{\text{Sum } W_t, A_{1t}, A_{2t}, \dots, A_{nt}}{\text{Sum } W_0, A_{10}, A_{20}, \dots, A_{n0}}$$

The asset whose value would be more certain at time t is a sample basket of all assets, since all assets do not react similarly to a change in the value of money. Money itself becomes uncertain in value and loses its liquidity on that ground. An investor who desires liquid holdings will take a sample of many commodities. If he tries to maximize his income from the inflation he will hold real goods and avoid money or fixed assets—unless he is absolutely certain that the government will stop the inflation in a very short time. The public generally does not expect the value of real assets to increase as much as it does; at least, this is a lesson of European postwar inflations. If the inflation results from war destruction and bottlenecks, the investor is both more safe and better off to hold real goods, particularly those which create bottlenecks. The future values of such assets, primary commodities stocks, plants and equipment, etc., will increase, and supposedly the government will not fight these capital gains. Conservative governments will take the position that, in order to rebuild an economy, favorable opportunities must be given to business, and therefore will not prevent effectively or tax speculative gains. Socialist governments, interested in reestablishing full employment very rapidly, will favor industries which form bottlenecks and then allow capital gains in these industries; at the same

time they will try, probably ineffectively since most profits, especially in such periods, are not distributed, to reach speculative gains when they are distributed to stockholders. In both cases, the holding of real assets realizes its purpose in maximizing personal income, and at the same time resulting in a further deterioration of the purchasing power of money.

More generally, liquidity is not the attribute of money alone. All commodities, to one degree or another, have liquid properties. However, since carrying costs are generally higher than liquidity-premia,¹ as concerns commodities, the holding of commodities for liquidity purposes is rare under normal circumstances. However, in special circumstances such as the inflation mentioned above, money loses its liquidity and investors have to satisfy their desire for liquidity, under both meanings of speculation and safety but especially under the latter, in another way.

Some factors make for less uncertainty in yields, thus for more certainty in real prices of assets. These factors may eventually lead to a classification of goods according to their liquidity, taken in real sense and no longer in money sense. Those unwilling to take chances will presumably hold goods possessing these liquid characteristics, since they are no longer interested in holding cash which has lost its price certainty.

For perishable commodities the following factors may be distinguished:

(1) Stability of consumer demand for the services rendered by the commodity. This stability can be expressed in terms of price elasticity and income inelasticity. Income inelasticity means that the owner of

¹ Cf. Keynes: Treatise on Money, p. 135 et seq.
Keynes: General Theory, p. 226 et seq.

such commodities will be able to liquidate them at any time. Price elasticity simply means small variations in prices.

(2) Slow real depreciation. If the depreciation is large and quick, as in the case of fruits, a high rate of turnover is needed and the commodity is generally useless as store of value.

(3) Number of uses of the commodity. When a commodity, such as a stock of raw materials has several uses, its yield is likely to be more stable and its liquidation generally easier.

(4) Perfectness of the market. This involves the homogeneity of the product, hence less real risks, and the absence of monopolistic behavior,¹ that disturbs the natural adjustment of prices and particularly the quality of information provided to buyers and sellers.

(5) Small transportation and storage costs.

In the case of durable commodities the same properties apply. Property (2) is generally unimportant. Properties (3) and (5), on the other hand, determine, for the most part, the stability of yield. Upkeep costs are added to transportation and storage costs. The liquidity of rolling stocks is a good example of the effectiveness of such real factors.

Finally, in the case of intangibles there exist real factors that make for a smaller risk of unfulfillment of anticipations. The three first factors concern the market; the three last concern the intangible itself as representing the value of a firm.

(1) Size of the market. A large Stock Market, i.e., one with a high capitalized value of shares and bonds that can be expected to be traded, will be more rational, if not more stable, than a small Stock Market in

¹ Monopolistic behavior is irrelevant if the investor is the monopolist.

which only a few securities are listed.

(2) Activity of the market, i.e., average quantity of transactions. This property depends on property (1) but is not equivalent to it.

(3) Perfectness of the market, namely homogeneity, competition and information.

(4) Value of the physical assets securing the intangible. These physical assets, even when they are not specifically referred to, pledge the reimbursement of debts.

(5) Value of the management of the firm. This property, not especially important for short-term securities, becomes the most significant factor in the long-term. Related to it are anticipations of change in management.

(6) Debt position of the firm. A corporation with heavy debts will likely be less solvent than one with few debts. These real factors are exceedingly important in business life. They determine largely the conditions of borrowing. A well-established firm is able to secure smaller rates of borrowing, because these different factors are known by prospective lenders. A small or new corporation is unable to borrow on favorable rates since the lack of knowledge about credit risks makes for higher rates.

The conclusions of case (3) are as follows:

(1) Risk of default increases liquidity preference for the two motives of speculation and of risk aversion.

(2) Yields different than expected minimize the long-run income, even in the case of a final gain.

(3) In a period of inflation, those desiring liquidity avoid money and hold real commodities possessing liquid properties.

(4) Uncertainty of yields increases the liquidity demand.

Case 4: Unknown Times of Liquidation

This is the more general case. The assumption of a given liquidation date, maintained during the first three cases, was largely unrealistic. Most people do not know when they will have or will prefer to liquidate their assets. Before examining the effects of uncertainty on liquidation times, we shall give some attention to the possibility of liquidating assets at any time.

In all organized markets, there exists more or less possibility of liquidating assets at any time, since an investor can shift his asset to another at the price prevailing on the market. The degree of shiftability of an asset depends on the same factors as those stated in the preceding case.¹ Size and activity of markets, and the institutionalization of markets, etc., render an asset more shiftable. The shiftability of an asset is primarily a social convention. Shiftability provides liquidity to assets that otherwise would be illiquid. The most striking example is that of mortgages, based on real property inherently illiquid. Liquidity in the banking sense, liquidity of prospective assets, corresponds largely to these factors. The possibility of shifting assets at any time, i.e., the possibility of liquidating them as concerns the investor, in a sense decreases the demand for cash. Investors have a substitute for cash in taking shiftable assets. Particularly the holding of cash by individuals with a high risk aversion in order to meet emergencies and unforeseen conditions may be replaced by the holding of shiftable assets. The more shiftable, the more liquid, in real terms. The same possibility of shifting assets is likely to decrease the risk aversion of investors, since

¹ Cf. p. 44 et seq.

they are no longer committed to keep their long-run investments until the time of liquidation. Finally, the existence of shiftability adjusts the complex of interest rates. The short-term interest rate is then related to and competitive with the long-term interest rate. The distinction¹ between maturities smaller than t , competitive with cash, and maturities greater than t , disappears as a clear-cut distinction. The possibility of liquidating assets at any time, through shifting, therefore decreases the liquidity preference. However, since the market prices at the liquidation time may or may not be desirable, the problem of the effects of uncertain liquidation time remains complete.

Uncertainty as to the time of liquidation results from circumstances. Two types of circumstances lead to uncertainty as to the time of ultimate liquidation of an asset. One type comprises those exterior to the investing process, the other includes those inherent in the investing process.

Future conditions outside the problem of value of assets can not be completely foreseen. Several causes of uncertainty exist as to these future conditions. First, some causes of uncertainty are personal to the individual investor, or to the firm. Among these, we can distinguish different factors. (1) Calamities, which include death and sickness for an individual, natural catastrophes such as fire, floods, and the like, loss of job or of income, unexpected defaults in collection, etc., are entirely out of the control of the individual or firm involved. (2) Unforeseen changes in individual tastes and consumption habits, and possible but unforeseen changes in the dividend policy of a firm are partly

¹Cf. Case 2, p. 33.

under the control of the individual or firm involved. Some causes of uncertainty are more general. (3) Production breakdowns, unexpected changes in the government's economic action, particularly in the tax system, belong to such a general type. These uncertainties require liquid funds at unforeseen times. With a possible lessening substitute, shiftability, they make for an increase in cash holdings on the part of individuals and firms. However, these cash holdings are ascribable to a liquidity preference largely independent of the problem of maximizing returns from investments. This liquidity preference arises independently of the problem of values. Moreover, the cash holdings required for that kind of liquidity preference are relatively stable in amount.

From another point of view, there exist some offsets to these causes of uncertainty. First, insurance appears to be a substitute for the cash holdings needed for uncertainty (1) listed above, namely calamities. The existence of insurance lowers the liquidity needs of the individual or of the firm. More precisely, insurance requires the payment of a premium, i.e., a definite amount of liquid funds; but once the premium is paid, the individual no longer needs any liquid funds against possible calamities. On account of the division of risks, which is the basis of insurance, insurance companies are able to supply a service which can be sold at a low price, i.e., low interest and fairly well-defined obligations. Therefore, the cash balances held against calamities decline as the result of insurance. Insurance companies themselves have relatively low liquidity needs, simply because they can foresee their needs with a high degree of probability, due to the division of risks. Thus they are able to hold assets of a relatively illiquid kind, such as mortgages or securities. The existence of insurance, then, decreases

the demand for liquidity of the economy as a whole. However, insurance companies usually hold more liquidities than necessary. Two factors tend toward that result. First, the reputation of an insurance company is based on its safety more than on its income potential. Considerations of safety make for greater liquid holdings. In the second place, administrative and legal requirements to protect policy holders oblige insurance companies to hold a large amount of liquid assets. In this domain, shiftable assets are highly substituted for cash. Finally, uncertainty (2), production breakdowns, can be partly insured against through some semi-governmental agencies such as the F.D.I.C. or other New Deal agencies. The effect on liquid balances, however, is not very definite since the membership requirements of such agencies oblige firms or banks to keep large liquid balances. In fact, by their requirements they enable their members to go without them under normal circumstances.

In a sense, savings banks and savings associations also offset some of these causes of uncertainty and act as quasi-insurance agencies. Savings banks enable investors to put money aside in a riskless investment bearing a small interest. These funds kept in savings banks can be used to meet calamities or unforeseen events. The service provided by savings banks is both more general and more limited than that provided by insurance companies. Savings accounts do not refer to a special risk as insurance policies do. They can provide funds for all the uncertainties mentioned above and also for uncertainties inherent in the investing process, which will be examined later. They are substitutes for cash in a more general way than insurance policies. However, the amount of funds provided is limited to the amount deposited. The coverage, therefore, is much less complete than that of insurance. The effect on liquid balances is consequently smaller. Nevertheless, the existence of savings associa-

tions decreases the amount of liquid holdings needed by the economy as a whole. Savings associations have relatively low liquid needs of their own because they hold assets for so many individuals. They are able to invest in relatively illiquid assets, especially mortgages. However, legal requirements and the desire for safety make them keep more liquidities than they really need.

Beside insurance and savings associations, there are other offsets to these exterior causes of uncertainty. Diversified business, with many products sold in many markets, may have smaller liquidity needs, too. More generally, a large and diversified enterprise, such as General Motors, has relatively lower liquidity needs than a small and specialized firm, due to the division of risks. Furthermore, the Government thinks it is its duty to maintain full employment. Therefore, large corporations are somewhat assured that the Government will take measures---loans and the like---to enable them to meet their unforeseen obligations, since their closing due to insolvency may create unemployment.

These causes of uncertainty, and their possible offsets, are independent of the investing process. Some other causes of uncertainty, which we shall examine now, are inherent in the investing process.

In this second type of uncertainty, the need for liquidity is associated with the maximization of investment returns. The first uncertainty is that of the future values of an asset. We have seen in case (1) that the investor will hold cash if A_t is smaller than B_t for a time t in the future. Obviously, the chances that A_t be smaller than B_t for a time t in the future are at least as large for any t as for a given t . It is even very likely that these chances are larger. Since investors must wait until the bottom of the market before buying, uncertainty as

to future values makes for holding cash, or an obligation maturing before the time corresponding to the bottom of the market. A second uncertainty is merely an extreme case of the first. A general vagueness about future conditions leads one to delay investing cash until an anticipated time of greater certainty. More particularly, when an investor vaguely contemplates going into business or undertaking a new real investment, he will usually delay investing cash and postpone his commitment until "conditions are right." There is obviously uncertainty regarding the time of liquidation of assets related to the optimizing process itself. In that case, the change in form of assets is very sharp. An example often noted is the postponement of investment decisions during periods of slump or depression and the sharp change that takes place at the beginning of recovery. Among other causes, this consideration of liquidity may have had some effect. The holding of cash until better times corresponds, then, to profit from better opportunities. A third uncertainty that arises when time of liquidation is unknown concerns the best time to sell goods. A certain time is often required to sell goods in the best condition. One is likely to achieve a better price, who is not obliged to sell at once on any (desirable or undesirable) terms. When a seller has liabilities and payments to make, such a phenomenon makes him hold assets, particularly liquid assets.

In any case, whatever the cause, uncertainty related to the maximizing process increases the demand for liquid assets, shiftable, shortly maturing assets, and cash. | Moreover, no offset to that kind of uncertainty exists, except, in part, savings associations.

The conclusions of case (4) are:

(1) Shiftability is a substitute for cash. The more shiftable, the more liquid.

(2) Uncertainties as to the time of liquidation always increase the demand for liquidity.

(3) Uncertainties exterior to the investing process can be offset by insurance, savings, and diversification of business. Uncertainties inherent in the investing process can not be offset.

Conclusions

The conclusions of this chapter can be summed up as follows:

(1) Cash holdings are made by those whose fear of loss outweighs their desire for gain, and by those expecting the liquidation values of assets to decline sufficiently to offset the loss of earnings. This can occur even in an inflationary situation since realization of inflation leads to high values on real assets and some equities, and low values on securities.

(2) Cash will be held if differences of opinion exist on the market.

(3) If the volume of cash held is large, the market opinion seems to be that interest rates will rise, i.e., that values will fall. This also implies, within limits, that inflation will not take place so fast as to offset those capital gains arising from holding cash.

(4) Unless the market is always wrong, periods of steady or declining interest rates will exist and short-term rates will equal or exceed long-term rates.

(5) A prospect of rising rates can only exist when potential borrowers are confident in the future and believe that future earnings will exceed present earnings. The extent of such possible rises should be limited by the costs of borrowing at present and holding liquid funds.

(6) Uncertainty of returns, i.e., anticipations of default or of yields different than expected, increases liquidity demands, when risks of losses or gains are not desired.

(7) Uncertainty of the time of future needs or of future profitable investments increases liquidity demand, but this is more or less permanent in nature.

(8) Unless liquidity desires corresponding to (1), (5), (6), and (7) are overwhelming the market, the supply of new securities and the volume of savings will dominate the actual interest rate and the value A_0 of any asset as well as anticipations concerning the future set of A_1, A_2, \dots, A_t .

CHAPTER III

THE SOCIAL FUNCTION OF LIQUIDITY

Liquidity and liquidity preference are present in all capitalist economies. However, their benefit to the society has been challenged by many economists. The following developments do not pretend to be a general statement about the social function of liquidity, but rather a bundle of considerations concerning the social role of liquidity. Many economists, including Keynes, have been inclined to charge liquidity preference with all evil. Such an attitude might have resulted from thinking primarily in terms of deflation. The social cost of liquidity should not be viewed only in terms of deflation but also in terms of efficiency and incentive to profit.

Liquidity, when considered as an institution affecting the working of the economy, must be viewed somewhat differently and more generally than when considered as a problem of individual planning or of market operations. The significance of the institution for social welfare becomes the focus of attention.

Liquidity inherently reflects the differences of opinion among individuals or groups of individuals, as has been repeatedly stated in the preceding chapter. It is a natural result of a free economy in which decisions are made by individuals. Those who seek liquidity at any time prefer securities to real assets and short-term securities to long-term ones. Either they expect decline in values or they prefer small risks

to risks of large losses. Those who avoid liquidity prefer real assets to securities and long-term commitments to short-term ones. They expect higher values or are willing to take risks in the hope of a large profit. It follows that the system of cash and debt instruments makes it possible for those who prefer risks to take larger ones and for those who do not to take smaller ones. Particularly those with an idea, an invention, or a technique to develop can obtain capital from those who do not, providing that they are willing to absorb a risk. It also means that the prospects of rising interest rates hold long-term rates up and bring short-term rates down, thus preventing the rise. Similarly, prospects of falling interest rates increase rates. This may have some effect on both investors and lenders, more important as asymmetry exists between the two categories. Finally, the possibility of change in liquidity preference, especially when the changes in liquidity desire are sharp, may upset values at any time, thus leading to wide variations in values and profits. The desire of some to avoid risks magnifies the losses and profits of others.

Liquidity, therefore, is an inherent part of a free economy. It makes cooperation possible among persons with different desires and abilities. There is a case both for and against liquidity preference.

The Case Against Liquidity Preference

It will be noted, first, that many points listed below as against liquidity preference may be understood as favorable to it under different circumstances. The advantages and disadvantages of liquidity are only a matter of degree. The effects of liquidity preference will be considered in the long-run and the short-run.

In the long-run, increase in liquidity preference diverts a large amount of investable funds from productive investments. In the absence of liquidity preference, all savings will be invested and the equality saving and investment, as in the classical model, will always be realized "ex-ante." Building of liquidity reserves results in a leakage in the mechanism. The level of income, on a long-run basis, is lower when liquidity preference is increasing. The argument runs as follows: investment has a multiplier effect on the level of income; hoarding has no effect of this kind, whatsoever. If a part of savings continually goes to hoarding, the multiplier effect will be lower since it will involve only invested savings. Therefore, the level of income will be lower. The building of liquid balances in the long-run has, then, acted as a brake on economic development. However, if liquid savings are invested in liquid securities, they contribute to economic activity. Moreover, the existence of liquid investments tends to decrease the effect of risk aversion, i.e., the amount of cash hoarding. Therefore, this basic argument concerning liquidity preference and the level of income, in a dynamic way, is not so clear-cut as it first appears to be.

From another point of view, large cash balances serve to keep the price level down in the long-run. In the assumption of a neutral monetary policy, i.e., of a policy which does not change the supply of money, this action on the price level may be very determinant. Historically speaking, it seems that the increase in liquidity preference, due to an increasing risk aversion, has been important in the fall of the price level during certain periods. As we have already noted, the speculative motive for liquidity preference can not have long-run consequences. Only the risk aversion motive affects the long-run economic process. Generally speaking, such effect on the price level has been criticized because of

its income implications: an increasing income level (in the absence of technological changes) is supported by an expectation of rising prices, an expectation which is contrary to the liquidity preference. Since the level of income conditions such things as employment, it has been charged that this long-run checking on the level of prices causes unemployment. It seems, however, that more valuable charges exist against liquidity preference than this vague criticism of holding the price level down in the long-run.

In the second place, since the shorter the maturity, the higher the liquidity, liquidity preference favors lower yields on short-term securities than on longer-term assets. The complete argument is approximately as follows: liquidity preference favors shorter rates and thus increases the supply of short-term assets. The effect of this increased supply is to lower the interest rate. If borrowers prefer short-term borrowing because of lower rates, the difference between short and long-term rates will diminish, but not enough to equalize long-term and short-term rates. Having lower rates, short-term borrowing possesses a kind of premium over long-term borrowing and enterprises will be more willing to borrow short-term. At the same time, enterprises rely on the continuation of the flow of the short-term lender to pursue their long-term income-earning operations. Such a relation between short-term borrowing and long-term immobilizations presents a risk of insolvency in the case of a decreasing supply of short-term credit. Thus, firms preferring to borrow short-term are inclined to invest in quickly realizable assets. Even in the absence of borrowing, the liquidity preference of the firms inclines to prefer investments which pay off quickly. In the long-run such a psychology encourages repairs over new equipment, addition to plants over building new plants, and inventories over fixed capital. At the same

time, it discourages new firms which can hope only for long-run income, and favors the old well-established firms.

Finally, in the long-run, liquidity preference acts in a kind of cumulative way. The more liquid assets an individual has, the more he can borrow at the lowest cost. Liquid assets sustain borrowing, which serves to purchase liquid assets. The existence of intangibles reinforces this effect of liquidity preference. A note is backed by a real asset. This note itself serves to back another note which in turn guarantees a third note. The effect of unrealized anticipation on real assets is then amplified several times and causes much more harm.

In the short-run, there are other social costs of liquidity. First, an effect of liquidity preference is to stabilize the interest rates. Such a result can not be harmful "per se" and can even be useful. However, by stabilizing the interest rates, liquidity preference encourages the postponement of investment in real assets. Liquid assets are convenient to hold, and in times of uncertainty people prefer to hold liquid assets for their certainty. Even in times of less uncertainty the anticipation of a rise in interest rates makes investors hold liquid assets. Postponement of investments, although not harmful in the present, slows down the rate of investment. In certain circumstances, postponement of investments creates a high degree of unemployment and then may cause or accentuate a slump.

On the other hand, the existence of high cash balances presents a potential instability. It is true that liquidity preference serves as a stabilizer, but it is a double-edged tool. Cash balances, by nature, can be quickly converted into other forms of holding assets or into consumption. When there is enough similarity of opinion among cash holders, and when the liquidity preference of the quasi-totality of holders suddenly decreases,

the effect on other assets is very violent. As we have formerly stated, liquidity preference is a psychological phenomenon, i.e., subject to sudden and important changes, when investors have more optimistic or more pessimistic expectations, when investors expect the interest rates to rise or fall. If the liquidity preference decreases, i.e., if people expect interest rates to fall or if the risk aversion declines, cash balances are quickly converted into other assets and this may cause an inflation, uniquely due to changes in speculation. The less difference of opinion there is, the greater is the effect. On the other hand, liquidity preference can quickly increase, due to uncertainties or to a greater risk aversion, or to an anticipation of rise in interest rates. In such a circumstance, the effect on investment can be very sudden and harmful and can bring deflation and unemployment.

It can be noted that it is likely, in a situation of potential inflation, that speculation based on liquidity preference will tend to be unstabilizing, unless there is conviction in a firm monetary policy from the government. For it is expected that without firm governmental action inflation will feed itself and perpetuate, making for the holding of real assets since it is likely that people anticipate the inflation to be shorter and weaker than it really will be. This unstabilizing effect of speculation in times of inflation has been particularly noticeable in most European countries hit by postwar inflation. Similar reasoning could be applied to the times of potential deflation. In the bulk of the 1930's deflation, an increase in liquidity preference has been a powerful factor in postponing the recovery. If the effect of a stable liquidity preference is to be stabilizing, changes of liquidity preference usually have very erratic consequences.

When a large part of the nation's wealth is represented by supposedly

liquid claims, through the cumulative process encountered earlier, the economic safety of the nation, i.e., its income stability, lies at the tide of an almost unforeseeable psychological factor. For the economy as a whole, the more liquid an economy is the more fragile it will be.

A third point that can be made against the liquidity preference in the short-run concerns the impact of unemployment. The cost of unemployment is born by the owners of unemployed resources.¹ The owners of unemployed resources are those who invested their liquid funds into real assets and then supported the economic activity. Those who profit from liquidity are those who retained their liquid funds in the form of cash. The profit of liquidity holding is then at the cost of innocent and third parties, not of those who induce investors to prefer cash because of unworthy investments.

Finally, the case against liquidity preference is that it tends to cause unemployment and postponement of economic opportunities in favor of hoarding.

| The Case in Favor of Liquidity Preference

In spite of all its deficiencies, liquidity preference brings many advantages to the economic system. First, it encourages savings. Many individuals have a low risk preference and are not gamblers by nature. They would not save unless they found safe investments. Liquid assets, with their certainty of prices, enable them to save. The safety of such liquid investments is probably one of the biggest incentives to save,

¹Without reference to those unemployed themselves, who evidently can not keep large cash balances.

since most personal savings are kept in liquid form, bank accounts or insurance policies. More generally, liquid assets and the possibility of saving in liquid form have the quality of convenience. Most savers are not professional investors and are not interested in speculation. They do not want to change the form of their holdings often, and save in order to create reserves for the future more than to earn an income. Risky investments presume a certain knowledge of assets, a knowledge of the market, and above all, the necessity of keeping close watch on investments made. Such watching and such risk do not attract the ordinary saver. From another point of view, that very fact indicates that most criticisms of the speculative motive for liquidity preference are over-emphasized. Most investors hold liquid assets because of their safety and do not speculate on a future rise in interest rates. The amount of speculative liquidities, finally, is much smaller than it is expected to be by most economists. Because of this, the effect of liquidity preference is more stabilizing than erratic. This can be summed up as follows: The average liquidity preference stays relatively stable while the liquidity preference of marginal investors, particularly on the Stock Market, i.e., the marginal liquidity preference, is speculative. By favoring savings in liquid form the liquidity preference favors banks, insurance companies, and other financial institutions, providing them with funds and also providing them with liquid uses for funds. (Such institutions could hardly exist in the absence of liquid assets. | They perform a useful service to the economy by smoothing economic operations. | All these encouragements to saving are beneficial to the economy, of course, only in the measure in which savings are useful in the particular situation of the economy. More specifically, when savings are useful, there is a

probability that risky savings (or at least income-earning investments) are preferable because of their income effect, to liquid savings. Similarly, when savings are harmful, i.e., when the economy is in a slump, liquid savings are more harmful than invested savings, since the former do not create any income while the latter directly increase investments. Thus, this effect of liquidity preference (favoring savings) is at best a question of circumstances.

— Secondly, liquidity preference does not only encourage savings, it also encourages investments. A liquid note is often practically understood as a note about which the lender is not concerned with the identity of the borrower.¹ The identity of the borrower is considerably less important in short-term credit than in long-term credit. Thus, the liquidity preference finally equalizes the conditions of borrowing among firms. Differentiation in long-term rates between an old, well-established firm and a newly created firm do not exist to the same extent in the short-run. For the investor, liquid assets mean that he need not worry about the personality of the seller, either the seller of assets or the seller of debts, or, more generally, about the characteristics of the asset. Liquid assets are always homogeneous and very precisely determined by the specifications of liquid asset markets. (The liquidity preference, in that sense, makes for better market conditions and, reciprocally, the assets possessing a good marketability are liquid.) Among other elements, homogeneity of the asset, predominance of competitive forces both on sellers' and on buyers' sides, and information concerning transactions

¹R. McKean: "Liquidity and a National Balance Sheet," Journal of Political Economy, 57 (1949).

generally accompany liquid assets. The liquidity of an asset renders economic transactions easier since the characteristics of the asset are already determined. But this argument has another aspect. When an economy has a large amount of liquid assets it relies more on solvency and on the honesty of people than an economy with fewer liquid assets relying on real factors. Liquidity preference also favors investment from another point of view. Since firms and individuals need to be concerned with such liquidity preference, they probably will pursue a safer and wiser policy. They will undertake illiquid investments, and the risk involved in them, only when they possess a sufficient liquid cushion. Thus, liquid assets bridge the gap of mistrust and doubt between borrowers and lenders, and encourage saving and investment on a free and voluntary basis. Still, under the encouragement given to investment, liquidity preference reduces the risks involved in the economic process. Necessity of holding liquid assets renders bankruptcies and insolvencies less numerous and then serves to increase the optimism in the future of the economy.

A third point can serve as an argument in favor of liquidity preferences. Liquidity preference is a sort of filter between wise and unwise investments. Poor decision-makers and wildcat investors can not borrow except at their own risk, since they must provide liquid securities or hold liquid assets as collateral. When there is real uncertainty about the future returns of an investment or, under another formulation, about the long-term value of a long-term and illiquid real asset, liquidity preference prevents undertaking them. In that sense, liquidity demands protect economic resources and prevents wasteful use of these resources. When, due to circumstances, the liquidity of an asset becomes

unimportant, for example in a war situation, there are many examples of such waste resulting from the relaxation of the liquidity rule. When an authority factor replaces this liquidity filter a good public-ity man can promote a fancy investment and misuse economic resources, which he could not have done if complying with liquidity requirements. On the other hand, liquidity makes higher profits possible. Those willing to undertake illiquid projects may suffer from less competition, due to the existence of liquid investments. Since generally speaking, a reluctance to undertake risky investments exists, those who do it are entitled to higher profits if the anticipations are realized. This result of liquidity provides a dynamic quality to the economy.

The conclusions of this chapter are as follows:

- (1) Liquidity is the result of a free economy, allowing cooperation between people with different desires and abilities.
- (2) In the long-run, liquidity depresses economic activity and may cause unemployment. It also induces enterprise to undertake short-term realizations rather than long-term ones.
- (3) Stabilizing, in general, the interest rates, it presents a potential instability.
- (4) Liquidity makes it possible for those who prefer risks to take larger ones and for those who do not to take smaller ones.
- (5) Liquidity considerations prevent the undertaking of unreasonable investments.

CHAPTER IV

KEYNES AND THE QUESTION OF LIQUIDITY

Any study concerning the problem of liquidity preference has been initiated by Keynes' ideas, and his contribution to the subject is so outstanding that it is useless to try to measure his participation. However, due to the fact that he was the first to state this conception about the choice between different assets, there sometimes exist some confusions in the General Theory between slightly different notions, as well as some overestimated points. The object of the following discussion is not to explain, criticize, or judge Keynes' conceptions but merely to attempt to trace some relationships between the cases stated in the preceding chapters and Keynes' ideas. Three general topics in Keynes' General Theory (Book IV) are particularly close to our concern; they are the formation of anticipations, the problem of choice between cash and income-yielding assets, and the social cost of liquidity.

The Formation of Anticipations

In Chapter 11 of the General Theory, Keynes stresses that the yields relevant to anticipations concerning the marginal efficiency of capital are not the current yields of assets but the prospective or "ex-ante" yields. More precisely, the prospective yields q_1, q_2, \dots, q_n and not only the yield q , determine the marginal efficiency of capital. Such a development is basically the same as the statement made earlier in this

study concerning the future values A_t . The anticipations about future values concern only A_t in the first three illustrative cases since only one liquidation time exists, but they concern the future set of all A_t in the more general case, (4). The only difference, then, is that Keynes starts with the general case; otherwise, a discussion about prospective yields is the same thing as a discussion about future values.

The effect of an increased supply, a question neglected in this study, has been quickly examined by Keynes.¹ Two factors make an increased investment result in lower yields. First, the prospective yields will fall as the supply of a certain type of investment increases. Secondly, and this is for Keynes a more significant reason, pressure on the costs of production will tend to make their prices rise, which in turn will cause the price of the investment to increase. This second point assumes that the cost of production of investment is very elastic to demand. In times of unemployment, it is likely that there will be idle factors of production. An increased demand for investment will not then result in higher prices, unless there are bottlenecks, but merely in the use of some previously idle factors. A more general criticism of Keynes' conception is that he neglects possible changes in technology in the field of capital goods.

The importance of forecasting leads Keynes to criticize the Fisherian possible cleavage between the real and the money rate of interest.² If a change in the value of money is not foreseen, the repartition between cash balances and real goods will not be affected and the only result will be an "ex-post" capital gain or loss for the holders of money. On

¹Keynes: General Theory, p. 136.

²Ibid., p. 142.

the contrary, if the change is foreseen, "the price of existing goods will be forthwith so adjusted that the advantages of holding money and of holding goods are again equalized." Although basically right, in emphasizing the prospective aspect of the choice between goods and money, this argument fails to give a completely satisfactory answer. It is not sure, due to differences in anticipations, that the holding of goods and the holding of money will be exactly equalized as it is supposed that they were before. Furthermore, the question of individual anticipations, which are based precisely on differences with the general market anticipations and try to be smarter than the market, is avoided in Keynes' reasoning. For an individual, a distinction can easily exist between the real and the money rate of interest.

From another point of view, Keynes says nothing about the relationship between the general market expectations and the level of cash balances. If there is any considerable amount of cash balances, it can not be explained solely by risk aversion.¹ The reason is that the market expects a future rise in interest rates, or in Keynesian terms, a future rise in the marginal efficiency of capital. The background market expectation in time is that values fall slightly every year in the case of a considerable amount of cash balances. Keynes, on page 142 and generally in all his developments concerning the liquidity preference, obviously considers the amount of cash balances to be important, important enough to be a determining factor in the rate of interest. However, Keynes does not state this condition of the increasing marginal efficiency of capital. Moreover, if not Keynes, his followers, particularly Joan

¹Here again we avoid bringing up the problem of transactions, or income, money.

Robinson and Alvin Hansen, forecast that marginal efficiency of capital will decline in the future. What can be called the pessimistic Keynesian school is based on such an assumption of the declining marginal efficiency of capital. Unless investors are unaware of this pessimistic conception, or disagree basically with it, they will be better off to hold real assets and keep minimum cash balances in the present, anticipating a future fall in the marginal efficiency of capital. The amount of speculative cash balances will then tend to be small, even though short-term phenomena might inflate them from time to time. Such an assumption is obviously inconsistent with Keynes' theory of interest, though it seems to be consistent with other Keynesian developments.

In Chapter 12, Keynes considers the causes of uncertainty, a problem encountered in case (1) of the present study. It should be remembered that in Book IV of the General Theory Keynes is uniquely concerned with capital goods. The problem of choice of savings in liquid form or in capital goods is slightly different from that of choice of holding assets in liquid or in illiquid form. Although generally speaking, the same factors and the same reasons for choice are encountered, a slight difference exists in point of view. For Keynes,¹ the expectations of prospective yields depend on various factors, or rather, on two more or less certain factors---the existing stock of capital assets and the strength of consumer demand---and on three uncertain factors---the future supply of capital assets, the changes in consumer demand, and the level of income. The first two factors seem relevant to determine the current

¹Ibid., p. 147.

yield, but can hardly be a motivating factor in determining the prospective yields. They affect the value A_0 , which is precisely the element known to the investor since it is the market price, but not A_t , the factor which the investors attempt to find through anticipations.

From another point of view, Keynes stresses the importance of the state of confidence. Since the base of knowledge is very precarious this confidence in one's judgment is certainly a point to be emphasized. It affects both long-term and short-term expectations.

Then Keynes shifts from long-term considerations to an analysis of speculation.¹ In the near future, according to Keynes, it is more important to beat the gun than to have a correct forecasting about the future of real assets. The reasoning at this point seems somewhat dubious. The important thing is to have a good forecast of the future values. In a market concerned with real assets, such as a commodities market, it is hardly sustainable that the problem of forecasting the future utility of the commodity traded is unimportant. Obviously someone may enter and make successful speculations without knowing anything about the commodity traded but he will not be successful very long. Finally, market expectations concern the real factors, the real utility of the commodity; individual expectations concern these real factors both directly and indirectly through anticipations of the anticipations of the market, but the derived anticipation, the latter, can not be sufficient. Keynes seems to think that organized markets have become similar to a society game, with continual redealing of hands. Such a conception may be exaggerated. In markets dealing with intangibles such as securities or, more generally, debts, the relation of intangibles to real assets is

¹Ibid., p. 153 et seq.

already indirect and with a general confidence in the honesty and solvency of debtors there are no real factors to anticipate in the case of debts bearing a fixed yield and relatively few in the case of debts bearing variable yields such as stock shares. Then the investors can not be blamed for trying to "beat the gun" since it is the only thing to do. The task of "defeating the dark forces of time and ignorance which envelop our future" is not the task of professional or amateur investors in securities markets, since ignorance about the future of assets, i.e., about the solvency, the risk involved, and the honesty of debtors, is supposed to be already removed.

Moreover, in this development concerned with speculation, there is some confusion. First, there is confusion between confidence in oneself, gambling temperament, and risk preference. If a gambler is generally confident of his expectations, there are other persons who dislike gambling but may still have confidence in themselves. It is not reserved to gamblers to anticipate the future reactions of the market, as Keynes seems to think. Similarly, risk preference is generally characteristic of gambling, but here again some individual may like the risk and dislike the gamble if he risks when he has some positive clues that his anticipations will be realized and not when he has only an intuition like the gambler. Moreover, as we have stated before, risk preference and confidence in one's anticipations are not the same problem.

Another confusion concerns the very fact of forming anticipations about the future values of assets. Keynes, in his development about speculation, thinks only in terms of short-term price fluctuations, short-term market phenomena. But the anticipation of future A_t is more general than a mere anticipation of short-term fluctuations. Moreover, these fluctuations are very sudden and can not generally be foreseen

more than a week in advance. They are a relatively unimportant factor in the majority of cases, and even for professional investors, in the determination of holdings. Such a determination considers a greater than one week. However, short-term fluctuations may cause an investor to change the form of his holdings in a very short time, in order to profit from a short-term capital gain on one asset or another; but generally speaking, even if he occasionally does so, he will consider some other factor, and a longer time, when he chooses the form of his assets. The risk in such short-term capital gains is very great and it is unlikely that an investor will make a large profit, in the long-run, solely on such operations.

Finally, even on an "unreal" market such as the Stock Market, there are always long-term expectations which affect the choice between different forms of holding assets. The railroad industry, and the value of railroad companies' shares depends on the real returns of the railroad and not on Stock Market fluctuations.¹ Moreover, it seems that Keynes overemphasizes the importance of the Stock Market. Much of the capital accumulation has come from the retained earnings of companies and not from the Stock Market. At least, it is untrue to give sole consideration to the Stock Market when analysing the accumulation of capital.

The Choice Between Cash and Income-yielding Assets

Keynes' developments concerning the choice between cash and income-yielding assets are basically the same as those stated above. However,

This reference to long-term real factors is not inconsistent with the fact that in the short-run there are no anticipations about real factors in the Stock Market, but anticipations about future reactions of the market.

there are some differences which will be emphasized.

First, in the statement of the general theory of interest there are some confusing points. Keynes does not distinguish between the motives for holding assets and those for holding liquid assets. Basically, if we discard the transactions motive, as we have consistently done, the precautionary and the speculative motives¹ are motives for holding assets and not motives for holding cash. They induce the holding of cash in certain circumstances and the avoidance of cash in others. As protection against unforeseen circumstances, the individual with a low risk preference, who will be more inclined by nature to overemphasize these unforeseen conditions, will keep liquid assets; but an individual with a high risk preference may hold an illiquid, but shiftable, asset such as a security. The speculative motive is narrowly defined by Keynes, on page 197, as speculation merely between cash and securities. In a more general sense, the speculative motive, i.e., the holding of assets to profit from future conditions, can induce the holding of cash but can also induce the avoidance of it. Even in a framework comparable to that of Keynes the speculation is in and out of cash and not always in favor of liquidity. Keynes, when he analysed the bull-bear position, himself presented the two aspects of the question. The preference for liquid assets is different from these motives. The holding of cash results first from the convenience of cash. In the second place, it results from risk aversion, particularly when a large uncertainty about the future exists. Last, it results from the anticipation that at a time t in the future, A_t will be smaller than B_t and that it is preferable to wait for the bottom of the market to buy income-yielding assets. These motives for holding

¹Keynes: op. cit., p. 170 and p. 195 et seq.

cash balances are only a part of the motives for holding assets, namely, precautionary and speculative motives.

A second confusion found in the General Theory is a confusion between two definitions of liquidity. When Keynes analyses the act of saving,¹ he considers the form in which an individual will hold the command over future consumption. He distinguishes between money, "immediate, liquid command," and another asset, "leaving future market conditions to determine on what terms he can, if necessary, convert deferred command over specific goods into immediate command over goods in general." The definition of liquidity, and of cash in particular, is, then, a definition of price certainty. Cash is preferred because it has a certainty of value not only in the present, but also in the future. Choosing cash, the investor knows that with the amount of cash he has he will be able to buy the same amount of securities (or any other goods) in the future as in the present. This conception of liquidity is strictly the price certainty theory, taken in a narrow sense. But Keynes later insists on the necessity of uncertainty as to the future of interest rates for the existence of liquidity preference for money.² The argument, and the conception of liquidity, are different. The investor prefers money, not because he will be able to buy the same amount of goods in the future as in the present, but because at a time t in the future he will be able to buy more goods than before. This corresponds to the speculative motive for holding cash. In Keynes' scheme, the preference for money in the present corresponds to an expectation of a higher interest rate in the

¹Ibid., p. 166.

Ibid., p. 167 et seq.; p. 201 et seq.

future, and then of a lower value of securities. With the same amount of money the investor will be able to purchase more securities in the future than he is able to do in the present. The definition of liquidity is no longer a question of price certainty, but a question of speculation. It can be noted that this difference is at the center of all discussions and all definitions of liquidity. The trouble with liquidity is that it is a quality of price certainty and, at the same time, of price uncertainty.

This second meaning of liquidity is generally the one accepted by Keynes. It is at the basis of the "bull-bear" discussion and of all developments relating the rate of interest to liquidity preference. From another point of view, when Keynes defines liquidity and measures liquidity preference, he does not specify whether or not he considers only a given set of assets, i.e., only existing assets, or a changing set of assets such as existing and new assets. When he studies the liquidity function, L_2 ,¹ he indicates that a change in interest rates affects M through a change in L_2 , but also through a change in income, then L_1 . Thus, he seems to include new assets in his reasoning, since new assets are the only ones which can affect the level of income. But in other parts of the General Theory² he reasons solely in terms of existing securities; that corresponds to the shape usually given to the Keynesian liquidity preference³ and seems practically the assumption taken by Keynes. Finally, on page 169, Keynes considers the complex of interest rates.

¹Ibid., pp. 200-201.

²Ibid., pp. 201-212, p. 197, pp. 177 et seq.

³Cf. above p. 26.

In this discussion he assumes that short-term interest rates can not be above long-term interest rates. His basic argument concerning that matter can be summarized as follows: if forecasting of the future was perfect, there would be absolutely no distinction between short-term and long-term interest rates. "All future rates of interest could be inferred from the present rates of interest for debts of different maturities." However, time preference of individuals in a world of uncertainty makes short-term maturities preferable to long-term. Therefore the short-term rate is below the long-term rate. Since forecasting of future interest rates is not perfect, people make anticipations as to the future interest rates. When r increases, i.e., the number of years for which one dollar is deferred, the value of one dollar is expected to go down and the long-term interest rate is expected to be higher than the short-term.

However, if these points in Keynes are different from the similar ones proposed in the preceding chapters, there are many points in common. First, Keynes stresses the necessity for differences in opinion to the liquidity preference.¹ This corresponds to the point stated above that for the market as a whole m should be different from zero and from one. The liquidity preference fulfills its role of stabilizer only when differences of opinion exist. More precisely, the more wide and different opinions are, as to the future of interest rates, the more stable it will be. At the same time, people should be convinced of the accuracy of their forecasting. When the individual investors are uncertain as to their anticipations, the interest rate is bound to fluctuate. When they are certain of their anticipations it will be stable. "Any level of interest which is accepted

Ibid., p. 169 et seq.; p. 201 et seq.

with sufficient conviction as likely to be durable will be durable."¹ Such confidence in one's anticipations will probably arise in times of relative uncertainty. In times of relative certainty about the future, individuals will tend to have more similar anticipations. On the contrary, in times of relative uncertainty, but not of large uncertainty (in which individuals will hold cash), individuals gamble either toward higher or lower interest rates, thus maintaining the balance of forces and the existing interest rate. Similarity of opinions creates erratic interest rates. When the uncertainty is such that all people, by risk aversion, shift to cash, the interest rate will suddenly rise beyond all anticipations. "It is interesting that the stability of the system and its sensitiveness to changes in the quantity of money should be so dependent on the existence of a variety of opinions about what is uncertain."²

Related to the same question of confidence in one's judgment, the effect of monetary policies on the rate of interest is examined by Keynes.³ A monetary policy directed toward lower long-term rates can actually miss its purpose completely, even though the measures are consistent with the object, because of the psychological reactions of investors. On the contrary, a conservative monetary policy may lower long-term interest rates by diminishing the uncertainty, namely the uncertainty as to the monetary action of the government, which has been proved a most influential factor in the eyes of investors. Many failures of reformers in the monetary field, especially Socialists, are uniquely due to such a factor.

¹Ibid., p. 203.

²Ibid., p. 172.

³Ibid., p. 203.

As concerns the classical theory of interest,¹ one must admit that the Classics neglected completely the speculation factor in determining interest rates. Most of the classical developments concern the supply of savings and the demand for new investments. If, sometimes, the tendency in the liquidity preference theory of interest is to forget new investments and consider only existing capital, the tendency in the classical theory is to forget the existing assets and consider only the new assets. The question of speculation is mostly concerned with the redistribution of existing assets and the relation between cash balances and previously held assets, plus new assets. The Classics insist on the close substitutability between money and securities as store of value, while the Keynesians insist on the differences between cash and securities. The Classics were, however, aware of the risk aversion of individuals, but considered the question of risk different from that of interest rates. Risk led to a risk premium above the interest rate. But they were considering a zero demand for cash for speculative purposes, so that $m = 0$. Money was strictly related to income, and never to the rate of interest. Cash was neutral as far as the equality of saving and investment was concerned.

In Keynes the supply and demand for new loanable funds does not determine the rate of interest. The demand for loanable funds is derived from the marginal efficiency of capital and depends on the interest rate in quite a classical manner. But the supply for loanable funds is derived from savings. Savings, according to Keynes, depend on income and very little on the rate of interest. Hence, income is the dominant factor in maintaining the equality between savings and investment, and consequently,

¹Ibid., Chapter 14.

the supply and demand of loanable funds. This does not mean, however, that the Keynesian theory of interest is not a supply and demand theory. But the supply and the demand considered by Keynes are predominantly those of investors who are readjusting their holdings or liability structures by buying or selling securities. Differences in individual anticipations are the basic determinants of such supply and demand and therefore of interest rates.

It is clear that the new loans process does not fit into that picture of existing assets process. The rate of interest is maintained independent of the supply and demand for new funds. Any temporary excess of demand for funds, since it does not affect the rate of interest, must be compensated by a dishoarding on the part of investors; or the income adjustment of savings and investment is so independent of the rate of interest that adjustment is made without dishoarding and the existence of an excess demand for funds is, as such, impossible. Obviously the Keynesian theory is incomplete in that regard.

The developments concerning variations in interest rates¹ are the same as ours concerning variations of the relation $A_t - B_t$. However, as we stated earlier, Keynes does not say that interest rates must rise in order for cash holdings to be important. If cash holdings are small, we are back to the old classical theory which considers m to equal 0 for the market as a whole. Speculative changes will not affect the value of assets and the repartition of holdings, if the cash balances held by individuals and firms are very small. From another point of view, L_2 , the speculative liquidity function, is partly a speculation about a

Ibid., p. 171 et seq., p. 201 et seq.

future set of L_1 , the income liquidity function. All depends on the relative importance given to this relationship. If one considers L_2 mostly depending on L_1 , the classical theory can be justified. If, on the contrary, one considers this relationship of little importance, a pure liquidity preference is generally the only possible answer. A lot of inconsistencies found in Keynes regarding this point of view can be explained by the fact that he thinks primarily in terms of the Stock Market. The relation between securities and real factors, especially the marginal efficiency of capital, is already indirect and may be very vague in the short-term, and then the effect of speculation is much more significant.

The Social Cost of Liquidity

For Keynes, there are two very different things on the investment market. First, speculation, which means to him "forecasting the psychology of the market." Secondly, enterprise, i.e., "forecasting the prospective yields of assets over their whole life."¹ Obviously, he prefers "enterprise" to "speculation," and for him, concerns of liquidity made "speculation" more important and even often more attractive than "enterprise." Liquidity indeed makes it easier to change the form of assets. However, it does not have only this harmful consequence. Day to day adjustments of lending and borrowing, of saving and investment, could not take place without the existence of liquidity. It is likely that without this possibility of changing the form of assets, the amount of cash balances would be much more significant. The effect of

¹Ibid., p 158.

liquidity, then, is not to reduce investment but to increase it.¹ Moreover, marketability and not liquidity is responsible for it. The relation of marketability to liquidity is close, as we have stated before, since generally the more liquid, the more marketable and reciprocally, the more marketable, the more liquid. However, marketability contributes only to the first step of liquidity, (to what can be called the real liquidity), which was the only step considered by early theories of liquidity. The second step of liquidity, namely the price certainty, is an entirely different subject. Keynes' criticism does not apply to it.

From another point of view, Keynes considers that Stock Market fluctuations have become a game, out of relation to real economics. Even if this were true, liquidity would not be the only factor to blame. Liquidity obviously contributes to such a situation, but it is not the only, and probably not the most significant, factor causing this situation. Speculation and speculative temperments, by opposition to enterprise, and entrepreneur temperments have to bear most of the blame. Again, a confusion seems to exist between speculation concerning assets and speculation concerning liquid assets. The criticism of liquidity against what can be called the short-term results of liquidity is therefore a little misdirected. That short-term speculation has become a game is not su much a consequence of liquidity as of a gambling temperment on the part of investors. The most that can be said is that liquidity has made it easy for these "gamblers" to fulfill their desire to speculate.

But Keynes does not only consider the short-term consequences of

1Cf. supra p. 63.

liquidity. His main criticism concerns the long-term social cost of liquidity. "That the world, after several millenia of steady individual saving, is so poor as it is in accumulated capital assets, is to be explained, in my opinion, neither by the improvident propensities of mankind, nor even by the destructions of war, but by the high liquidity premiums formerly attaching to the ownership of land and now attaching to money."¹ Such a problem has already been stated earlier and obviously constitutes the most severe criticism that can be made against liquidity. In this discussion, Keynes characterizes liquidity by very low elasticities of production and substitution. He states that in earlier times, land was considered to be a store of value and was accompanied by a high liquidity premium.² The basic argument proposed is that the rate of interest from mortgages on land exceeded the probable net return from cultivating the land. Such an argument seems somewhat dubious. The high rates on mortgages depended also on the uncertainties of times and principally on the insolvency of debtors creating a high risk of default payment. Moreover, the effect of high rates on mortgages in retarding the production of newly created assets has not been proved. If lenders on mortgages keep their returns in money form such effects may occur, but if they invest their returns it does not occur. The problem is not so much the high rate on mortgages as the use made by lenders of their funds, i.e., the general discussion concerning the form of holdings. Therefore, the discussion of the liquidity of land does not help the question of liquidity much. It remains that obviously the existence of liquidity and the liquidity preference create a brake on economic development. But Keynes forgets

¹Ibid., p. 242.

²Ibid., p. 241.

that liquidity serves as a kind of filter between reasonable investments and fancy programs. The reduction of risk and uncertainty in the economy as a result of liquidity is also omitted, although it performs a most valuable service to the economy as a whole.

Inelasticity of production and of substitution make for high liquidity premiums, but there is no standard of liquidity, only "a varying premium of which account has to be taken, in addition to the yield of use and the carrying costs, in estimating the comparative attraction of holding different forms of wealth. The conception of what contributes to liquidity is a partly vague one, changing from time to time and depending on social practices and institutions."¹

The Keynesian critical position can easily be understood, because he thinks primarily in terms of deflation. The General Theory dates from the crisis years. This appears evident when Keynes describes the inelasticity of substitution of money. "Thus, not only is it impossible to turn more labour on to producing money when its labour-price rises, but money is a bottomless sink for purchasing power, when the demand for it increases, since there is no value for it at which demand is diverted."² This type of reasoning is characteristic of the General Theory's one-way developments. In deflation, indeed, money is a bottomless sink for purchasing power. However, in periods of inflation, the purchasing power of money decreasing, it is likely that the demand for money as store of value will amount to relatively little.

The only reference to price inflation in Book IV of the General Theory can be found on page 207. "In Russia and Central Europe after

¹Ibid., p. 240.

²Ibid., p. 231.

the war a currency crisis or flight from currency was experienced, when no one could be induced to retain holdings either of money or of debts on any terms whatever, and even a high and rising rate of interest was unable to keep pace with the marginal efficiency of capital (especially of stocks and liquid goods) under the expectation of an ever greater fall in the value of money." Such a rare development deserved quotation.

CHAPTER V

THE MEANING OF LIQUIDITY IN ECONOMIC LITERATURE

The term liquidity is very common in economic literature. Paradoxically, very few systematic treatments of its meaning exist. Apparently, most writers are content with its ordinary definition. It stands for money or money properties without further clarification. Among those who have considered the subject more specifically, Keynes has been outstanding and hence deserves a special place. Of the others, none appears to have come forth with a very definitive explanation. Some of their ideas will be briefly considered in this chapter.

Various Conceptions of Liquidity

Before Keynes and the General Theory, the question of liquidity was uniquely related to banking. First, it was the theory of self-liquidating loans. "Real liquidity exists where the asset can readily be converted into cash because it is in that category of goods which (a) themselves consistently enter into human consumption or use, (b) are destroyed or permanently immobilized through such consumption and use, and (c) are normally replaced by new production."¹ Liquidity, then, means quick consumption of assets. A liquid note represents an amount of real goods to be transformed or to be consumed. In 1921, the Federal Reserve Board

¹Berle and Pederson: Liquid Claims and National Wealth, New York, MacMillan, 1934, p. 49.

gave its definition of a note "which is liquid---that is, which is issued or drawn under such circumstances that in the normal course of business there will automatically come into existence a fund available to liquidate each piece of paper, that fund being the final proceeds of the transaction out of which the paper arose."¹ The introduction of shiftability somewhat enlarged this narrow definition of liquidity. Liquid assets included not only the self-liquidating loans, but also the notes that could be rediscounted by the central bank and some other notes which could be shifted to other investors in a quick time. Then, "liquidity is a quality inherent in an asset or supplied to it by a reasonable stable mechanism of society furnishing reasonable assurance that it can be converted into cash within a period of time recognized by the commercial community in which it moves as relatively short."² Supposedly, such a conception is still important to the banker, since at the International Credit Conference of Roma (1953) which was concerned with "banking liquidity and the control of inflation" there was hardly anything else discussed. However, it obviously does not reach the heart of the question and can not serve as an answer to economic liquidity.

The General Theory initiated many studies in liquidity preference, and therefore, many definitions of liquidity have been stated. Among the most interesting are those of Marschak and Bronfenbrenner.³ In his first article, written in collaboration with Mr. Makower, Mr. Marschak charac-

¹Federal Reserve Bulletin, 1921, p. 1709.

²Berle and Pederson: op. cit. p. 26.

³Makower and Marschak: "Assets, Prices and Monetary Theory," Economica, 5 (1938). Marschak: "Liquidity and Uncertainty," American Economic Review, 39 (1949 supplement). Bronfenbrenner: "Some Fundamentals in Liquidity Theory," Quarterly Journal of Economics, 59 (1945).

terizes liquidity as follows: "Those two properties, safety and future saleability, which money possesses in a higher degree than many other assets are often lumped together under the name of liquidity."¹ Safety and general acceptability in a way correspond to nearness to cash but the relationship has to be elaborated a little . In his second article, Mr. Marschak presents a completely new and original theory of liquidity which he explains with mathematical models. First, he develops a conception of liquidity in the present. A liquid commodity, in the present, is a commodity without actual price uncertainty and without transactions costs. Such is money. Money has a given price in terms of purchasing power. One can acquire money in selling a given set of goods and immediately "sell" his money for exactly the same set of goods. Moreover, money involves no transactions cost. On the contrary, it can be stated in Marschak's terms that an old car is, in the present, an illiquid commodity. One can buy an old car for a price and be unable to sell it the same day for the same price. As regards the future, Marschak merely extends his conception of actual liquidity to the future. In Marschak's terms, liquidity can be defined as the "reversibility" of a commitment, both in the present and in the future. Such a definition can be criticized for not allowing for a speculative desire for liquidity, precisely when uncertainty exists as to the future values of money. The reasoning encountered earlier, concerning Keynes' first definition of liquidity, can be applied again here. However, Marschak's definition of liquidity in the present is very valuable in order to establish a scale of various assets according to their liquidity.

¹Makower and Marschak: op. cit., p. 284.

Mr. Bronfenbrenner's Conception

Mr Bronfenbrenner tried to clarify the question of liquidity by using a completely new approach. Before stating his general definition of liquidity, he defines some technical terms and, in fact, proposes a first definition of liquidity, different from that which he elaborates a few pages later. He begins with a definition of money on a liquidity preference principle: "A monetary commodity is one whose liquidity is sufficiently high to all individuals to justify its use for cash balance purposes, and the society's total money balance is made up of the total amount of these commodities actually held in cash balance."¹ Hence, liquidity seems similar to cash-balance use, which notion Mr. Bronfenbrenner further defines as "goods held especially (consciously) for the purpose of future direct exchange for other goods, which are unspecified in advance."² This conception of cash-balance use is in fact that of store of value. This definition is not altogether clear. An expected future exchange for specified goods may induce the holding of liquid assets, which will not be included in cash-balances. Moreover, there is some confusion between the holding of assets and the holding of liquid assets, for cash-balance use, since Mr. Bronfenbrenner does not imply as a condition that goods should be liquid. An investor who likes the risk may hold securities, or even a stock of real commodities "expressly for the purpose of future . . . exchange for other goods, which are unspecified in advance." The only attribute which keeps them from being part of cash-balances is "direct." These securities, or commodities, in gen-

¹Bronfenbrenner: op. cit., p. 404.

²Ibid., p. 404.

eral have to be turned into money and the proceeds of the sales are used to buy goods. However, this point seems a little weak to support a definition of liquidity, for in many instances, especially in the business world, the conversion into money does not actually take place. From another point of view, this definition appears a way of saying that a commodity which is held for direct exchange into goods is money, and hence, liquid. The distinction between cash-balances and asset-balances is based upon a relatively unimportant point and, on the whole, confusion remains.

On this basis, Mr. Bronfenbrenner states his definition of money on liquidity grounds. "Let L_{min} be the lowest liquidity in the cash-balance use of any commodity included in the cash-balance of individual A, which is therefore money to A. If now, any commodity which forms part of the cash balance of another individual B, and which is therefore money to B, has one or more uses to A in which its liquidity is greater than L_{min} , or would be greater if put to these uses, then this second commodity is money to A, even though A does not include it in his cash balance. . . . Any commodities which satisfy this condition for (nearly) all individuals in a community are monetary commodities."¹ Even if the final utility of a good is the same in all uses, the liquidity of a good in one use can differ widely from the liquidity of the same good in another use. "Capital goods in inventory are far more liquid than the same goods after inclusion in a final product."² The reasoning is simple. But it is rather vague, since one does not know if for the economy as a

¹Ibid., pp. 411-412.

²Ibid., p. 407 note.

whole cash balances include all commodities which have a higher liquidity, in any use, than the L_{\min} of all individuals, or of only the majority of individuals. Moreover, L_{\min} is a subjective notion varying in time, and the liquidity of commodities in any use is also varying. Therefore, Mr. Bronfenbrenner has to propose additional conditions in order to separate monetary from non-monetary commodities: "(1) Individuals must have identical conceptions of money, which do not change over time. (2) No monetary commodity can have any other use than the cash balance use."¹

Since these conditions can not be fulfilled in practice, the distinction between monetary and non-monetary commodities remains rather vague, although logically clear. The vagueness in Mr. Bronfenbrenner's attempt to be precise is no less than the vagueness found in Keynes, who does not show how "liquidity premium" is dimensionally comparable to "carrying cost" while defining a monetary commodity as one for which "liquidity preference" exceeds "carrying cost."² The ambiguity created by all the near-moneys is not removed and can not be removed. The trouble with near-moneys is that they will never be annihilated and will tend to increase as an economy becomes more liquid, due to confusion in the public's mind between one property of money and another different property of money.

Since, as we have stated above, the liquidity of a good in one use might be different from the liquidity of the same good in another use, Mr. Bronfenbrenner's definition of liquidity applies to one commodity in one use. "The liquidity of commodity a in use x is the marginal rate of substitution between this commodity in this use under existing market

¹Ibid., p. 412.

²Keynes: General Theory, p. 237.

conditions and the same commodity in the same use under hypothetical circumstances of perfect liquidity."¹

It is necessary to state what these hypothetical circumstances of perfect liquidity are. "By calling a commodity perfectly liquid in a given use we mean that it is absolutely certain that its holder can obtain for a unit of the commodity at least one hundred per cent of its (deflated) money cost to him, minus only depreciation compensated for by actual use, measured in terms of general purchasing power, immediately upon deciding to dispose of it."² This is a curious definition since it seems to exclude money itself and thus to contradict the first definition based upon cash balance use. Money is never sure to maintain its deflated general purchasing power, as we have seen in illustrative case (3), namely yields different than expected; thus, it is not completely liquid under Mr. Bronfenbrenner's definition. In fact, nothing would seem to fall into the class of perfect liquidity. The difficulty here is the same as the one encountered at the outset of the inquiry. The holding of money is dictated, at times and for some persons, by speculation on a future decline in prices. At other times and for other persons, holding is justified by safety, by fear of a risk in variable price assets. There is no way to make holding of money, or more generally, holding of liquid assets, depend upon one attribute alone and to use this attribute as a definition of liquidity. If speculation is made the basis of the definition, then other goods have speculative appeal. If safety is the factor considered, goods other than money may satisfy the definition, particularly in times of inflation.

¹Bronfenbrenner: op. cit., p. 407.

²Ibid., p. 408.

Mr. Bronfenbrenner seems to use speculation as the basis for definition, since he emphasizes sureness of obtaining at least the deflated value of the price. This is an aim at capital gain and should be referred to as such, and not as liquidity.

Finally, Mr. Bronfenbrenner writes the formula of liquidity as follows:

$${}_xL_a = \frac{{}_xU_a(p, k, t)}{{}_xU_a(1.00, 100, 0)} \quad 1$$

where L is the liquidity function of a good a in use x , p the probability factor, k a percentage of the price, and t the time involved in liquidation. ${}_xU_a$ means the final utility of commodity a in use x , presumably in the case of money, or another good, in cash balance use, the psychological satisfaction from the expenditure of the liquidated good. However, in uses other than the cash-balance use, the utility U is single valued and presumably includes the satisfaction coming from a secondary cash-balance use, if any. A clarification of the utility concept is necessary.

However, an infinity of liquidities exist of a good a in use x . For a given t , a whole scale of probability value-combinations exists. A probability $p = 0.9$ of obtaining a value $k = 10$, a probability $p = 0.1$ of getting a value $k = 110$, a probability $p = 0.5$ of getting a value $k = 40$, etc. The investor, then, must choose a probability-value combination. Furthermore, when we introduce the time element t , the value of ${}_xL_a$ becomes much more vague.

Mr. Bronfenbrenner solves this difficulty by maximizing the liquidity of good a in use x . He remarks that the values t , p , and k are obviously interrelated. Not only do they depend on themselves (inter-

¹Ibid., p. 408.

relation) but on external conditions which Mr. Bronfenbrenner calls constraints. Each particular combination of values p , t , and k , and therefore each liquidity ${}_xL_a$ is subject to a given set of constraints. Another combination is subject to part of this set of constraints but also to another set of constraints. However, Mr. Bronfenbrenner fails to show how the constraints are related to each other, which are general, and which particular to a given set of p , k , and t . Moreover, he fails to distinguish constraints due to the investor (such as confidence in one's self) and those due to phenomena external to the investor. Another confusion that arises is the following: undoubtedly constraints are included into values p , k , and t . The process of maximizing ${}_xL_a$, i.e., maximizing p , k , and minimizing t , according to the constraints attributed to given sets of p , k , and t , involves a double counting.

The whole question of maximizing ${}_xL_a$ involves many obscurities. "Mathematically speaking, maximization subject to restrictions and constraints of this type is dealt with by means of Lagrange multipliers, which will be denoted here by m . If ${}_xF_a(p,k,t)$ signifies the interrelation existing between the independent variables, the function to be maximized is no longer U alone, but $U(p,k,t) - x^m {}_xF_a(p,k,t) - \dots = W(p,k,t)$."¹ The result of this maximization is to transform the first function into:

$${}_xL_a = \frac{{}_xW_a(p,k,t)}{{}_xU_a(1.,100,0)} \quad 2$$

"It is this expression whose maximum value gives the liquidity function of commodity a in use x to the individual under consideration."³

¹Ibid., p. 408.

²Ibid., p. 408.

³Ibid., p. 408.

A general criticism of that definition is that, since k can be above 100, it applies to capital gains as well as to liquidity. Then, if the probability $p = 0.01$ is that $k = 210$ for a time $t = 7$, that makes the commodity more liquid than a combination $p = 0.9$ of getting $k = 99$ for a time $t = 7$, which is obviously unsustainable. Moreover, the suggestion $\frac{dL}{dp}$ greater than 0 is meaningless. An increase in probabilities of a very low k would certainly not increase the liquidity; on the contrary, the good will become less liquid.

There are many important problems omitted in Mr. Bronfenbrenner's article. The two most important, according to what has been said in Chapter 1 of this study, are the following. Time t characterizes the period involved in liquidating the asset, and not the anticipated liquidation time. Nothing is said about the time of liquidation, which is frequently the key to the liquidity problem. From another point of view, nothing is said about the motivation of liquidity, time preference, shifting of assets, etc., or simply safety.

Changes in liquidity functions are due: (1) to changes in the constraints, p , k , and t , (i.e., external changes in p , k , and t), (2) to changes in the quantity held (if imperfectly atomistic markets), (3) to importance given by an individual to each factor and (4) to change in the importance of liquidity to the individual.¹ However, the importance of confidence in one's anticipations and changes in such confidence are not included by Mr. Bronfenbrenner in the list of causes of changes in liquidity.

It can be noted that Mr. Bronfenbrenner defines liquidity as an "ex-ante" concept both for an individual and for the society as a whole.

¹Ibid., p. 411.

The liquidity preference for the society as a whole is merely the sum of the liquidity functions of individuals. "If at any time, all members of an economy have a liquidity preference (${}_xL_a$ exceeding ${}_yL_b$) for a over b, it is natural to ascribe this preference to the economy as a whole."¹ In fact, there are two confusions, concerning such liquidity and liquidity preference. First, for the economy as a whole there is no such thing as liquidity of a good in a use. A liquidity of a good exists, but is related to all the uses of the commodity. The liquidity function of a good, if any, refers to an averaging of all uses (with their respective importance) of the commodity. In the second place, Mr. Bronfenbrenner does not pay attention to the question of changes in price. The relative value of good a in terms of good b will change if a complete liquidity preference of a over b exists.

Mr. Bronfenbrenner attempts to give a utility definition of liquidity but the very purpose of the utility analysis is to avoid discussions about prices and values. Mr. Bronfenbrenner includes in his utility analysis an element which refers to such a value, k. Therefore, the interest of the utility analysis itself disappears. As a matter of fact, the reference to utilities, the ${}_xU_a$ factor, appears without use in the whole definition given by Mr. Bronfenbrenner. The argument could have been done as well with reference to a function ${}_xF_a$. Moreover, it seems that the question of liquidity is inherently dependent on the question of values and on differences in anticipations among investors that cause the values of liquid and illiquid commodities to vary relatively. The important factor in Mr. Bronfenbrenner's formula is not ${}_xU_a$ or ${}_xW_a$, but

¹Ibid., p. 410

p and k and the differences in appreciation of p and k among individuals. As we noted at the end of the last section, if liquidity is part of the utility of a good, and if for the society as a whole the liquidity of such a good increases, presumably its price will increase and its utility as a service-rendering asset or as an income-yielding asset will diminish. Moreover, the important thing is the relative importance given to liquidity in relation to the other properties of an asset, such as its income-yielding possibility, a question which Mr. Bronfenbrenner neglects in his paper.

Even if we agree with Mr. Bronfenbrenner in attempting a utility explanation of liquidity and of money, since money is defined in liquidity terms, it would be necessary to determine what gives utility to liquidity, and why a demand for liquidity exists. "The cash balance possesses utility to its holder, resulting from the utility of the cash balance use in satisfying the desire for liquidity."¹ Such a treatment of the utility of cash balances can hardly be sufficient.

The desire for liquidity has been studied in an earlier part of this study and can be related to Mr. Bronfenbrenner's definition, but this will not be attempted here. This conception of Mr. Bronfenbrenner's leads to the bizarre result that he treats the question of liquidity preference rapidly and without reference to the problem of speculation or of risk aversion; liquidity preference to Mr. Bronfenbrenner is merely a "derived concept" of the liquidity function.

The only reference to the question of liquidity desire is made when Mr. Bronfenbrenner considers what the question of liquidity would be if

Ibid., p. 414.

uncertainties did not exist.¹ In a world of certainty, in the general sense of the word, the utility of money and the utility of liquidity in general disappears, and presumably there would be no need for cash balances. However, Mr. Bronfenbrenner criticizes such a conception of certainty.²

In Mr. Bronfenbrenner's conception, certainty would be the entire confidence of an individual in his own anticipations, therefore, merely the disappearance of risk aversion because of unexpected factors that can destroy anticipations. We must agree, then, that liquidity would still exist in such a certain world. However, if it can not be disputed that liquidity is an "ex-ante" factor, the importance of the realization of former anticipations is obviously very great. In Mr. Bronfenbrenner's own terms, unrealized anticipations would exist in a world of certainty.³

This appears to be inconsistent with the premise, which was that people will always be sure of their anticipations. Moreover, Mr. Bronfenbrenner fails to show how a change in certainty, as he defines it, will be reflected in a change in money balances, and what the amount of cash balances in a certain world would be.

In conclusion, we can say that Mr. Bronfenbrenner's definition is not very adequate, since it applies as much to capital gain speculation as to liquidity. Moreover, the whole approach to the liquidity problem, the utility approach, seems inconclusive, since no explanation is given to the motives for liquidity preference. But the attempt made by Mr. Bronfenbrenner to give a precise definition of liquidity, even though inconclusive, deserved a special place.

¹Ibid., pp. 415-417.

²Ibid., p. 417.

³Ibid., p. 418.

CHAPTER VI

MONEY BALANCES AND INTEREST RATES

IN THE U.S.A. SINCE 1869

Statistical data is never adequate to study theoretical ideas, partly because the relevant statistics themselves are not always available, and partly because economic theory is necessarily stated in terms of "ex-ante" expectations, which, as such, are not statistically measurable. Statistics reach "ex-post" data, which is only the result, if action has been taken, of decisions based on "ex-ante" expectations. Nevertheless, some of the ideas considered in the previous pages can at least be compared with certain relevant data.

Among the ideas which have been developed in this study is the relation of liquidity preference to the amount of money held by the public, to short and long term interest rates, and to anticipations regarding changes in interest rates. Some information is available on these.

Statistics on the quantity of money in existence have been established for a long time and are relatively accurate. But a difficulty which has not been solved in economics is the proper measure of money in existence. The absolute quantity in terms of cash and demand deposits can be ascertained fairly accurately, although numerous technical problems arise even here. These include treatment of clearing items and of government, foreign, and interbank substitutes, the so-called near-moneys. Among these near-moneys, time deposits, short-term securities, saving

accounts, and the like are especially important. We shall consider two statistics of money supply, the first including total deposits adjusted (demand, time, and government deposits) and currency outside banks, the second concerning only demand deposits adjusted and currency outside banks.

Even this problem of classification is small compared to that of determining the proper comparison basis with which to interpret the significance of a given quantity of money. Economists have proposed several such bases of reference, but have not agreed upon one proper one. The quantity theory writers have emphasized the number of transactions, although they have not been too precise in indicating exactly what transactions are relevant, particularly as regards exchanges of debts and money related items, or more generally, any kind of intangibles. On the other hand, Keynes has suggested the level of assets, particularly securities, as the relevant comparison, but this is also vague since it involves difficult problems regarding the method of valuation and since it makes no suitable allowance for the amount of liabilities or debt, as distinguished from net worth, on the significance of the money supply. Finally, the simplest basis of comparison is the level of income, either net national income or gross national product. No attempt will be made here to determine the most desirable basis of comparison. Since it is the easiest to obtain, the relation of money supply to gross national product will be heavily relied upon. However, it will be completed with data concerning the velocity, i.e., rate of turnover, of money. Income velocity (ratio of money supply/G.N.P.) and velocity of money will permit a notion of changes in the level of the money supply to be obtained.

As concerns interest rates, the data is much less reliable. Interest rates found on capital markets do not correspond to pure interest rates as they are elaborated in economic theory. The pure interest rate is riskless, and the risk involved here is not merely the risk of default. Risks of changes in the value of money, in the monetary policy, in the supply of securities, etc., are also involved and are directly related to the problem of liquidity preference. We shall consider two different series of interest rates, both of which attempt to neutralize the first risk, that of default, at least under normal conditions. First, we shall compare the short-term New York open market rate (four to six months) to the yield of high-grade railroad bonds. These two rates, short and long rates, have been chosen as relatively riskless in the sense of risk of default. Moreover, railroad bonds have had an important market for so long that they are relatively exempt from monopoly forces which may affect the rates. In the second place, we shall rely upon the notion of basic yields of corporate bonds¹ at one year and thirty years of maturity. Basic yields represent the slowest yields obtained on high-grade securities at the same year of maturity, which are supposedly the yields of a theoretical riskless security.

A summary of the statistical data used follows:

- (1) Total deposits and currency outside banks over G.N.P.
- (2) Demand deposits and currency outside banks over G.N.P.

Sources: money supply: Banking and Monetary Statistics,
Federal Reserve Bulletin

G.N.P.: Kutznets until 1928 and the Department
of Commerce after.

¹D. Durand: Basic Yields of Corporate Bonds 1900-42, National Bureau of Economic Research, New York, 1942.

- (3) Annual turnover rates of total deposits (New York and other leading centers)
- (4) Annual turnover rates of demand deposits (New York and other leading centers)

Sources: Banking and Monetary Statistics and Federal Reserve Bulletin

- (5) Short and long-term interest rates (open market 4 to 6 months rate and high-grade railroad bond yield)

Sources: Banking and Monetary Statistics and Federal Reserve Bulletin

- (6) Basic yields of corporate bonds at one and thirty years of maturity

Source: David Durand: Basic Yields of Corporate Bonds¹

Four periods will be distinguished, as they correspond to important changes regarding liquidity: 1890-1918, 1919-1929, 1930-1941, and 1942-1955.

1890 - 1918

Two long-term trends appear between 1890 and 1918. From 1890 to 1908, the ratio of money supply/G.N.P. increases, and therefore, cash balances are larger than before. On the contrary, from 1908 to 1918 the amount of cash balances decreases since the ratio of money supply/G.N.P. falls.

Until 1908, the ratio of total money supply to G.N.P. rose from .48 to .55, and a tendency appears to use time deposits as cash balances. The picture, then, is that of an increase in cash balances relative to production. At the same time, interest rates fell until 1900, then

¹More precise indications regarding the sources follow the charts.

rose, indicating very little significant change. However, some narrowing of the gap between the long and the short-term rates did occur. Investors, therefore, demanded more short-term securities than they used to and fewer long-term securities. Suppliers were more willing to provide long-term securities and less willing to provide short-term. This was a sign of a growing liquidity preference, which was consistent with a growth in the amount of cash held. Suppliers of securities, anticipating that the fall in interest rates would be less important than the investors thought, tended to increase the maturity of obligations. Investors, since the short-term rate was above the long-term rate, still had the advantage in purchasing short-term securities. An increasing supply and a decreasing demand of long-term securities tended to bring the long-term rate of interest further up while a decreasing supply and an increasing demand of short-term securities tended to bring the short-term interest rate down. The liquidity premium still existing on short-term rates tended to be reduced. The evidence of this period suggests that liquidity preference was a factor tending to raise interest rates, especially long-term rates, as growing anticipations of continuous high demand for funds led to a greater holding of cash and of short-term debts.

On the contrary, from 1908 to 1918, the ratio of money supply/G.N.P. decreased from .55 to .48, annihilating the change which occurred during the preceding period. The decline of demand deposits and currency balances was sharper, until 1917, than the decline of time deposit balances. At the same time, prices, especially during the war years, rose very significantly. Although the level of prices is reflected in the G.N.P., this change in the level of prices tends to indicate that the decline in cash balances was more important than the ratio of money supply to G.N.P.

indicates.

In 1910, the difference between the short-term and the long-term interest rate was about .5%, or 14% of a rate slightly below 4%. This shows a rather considerable preference for long-term investments among investors and a preference among sellers for short-term liabilities. Although the preference for liquidity and the amount of cash-balances in 1910 were higher than in 1900, this last fact indicates that the absolute amount of cash balances for speculative purposes was relatively low. From that, we can deduce that a .50 ratio of money supply to G.N.P. corresponds approximately to the cash balances needed for transaction purposes (income balances) and that a speculative holding of cash-balances is reflected by an amount of cash balances higher than .50 of G.N.P. It may be more accurate to relate cash balances to the ratio demand deposits and currency to G.N.P., since most transactions money is demand deposits. A transactions need level of cash balances corresponds, then, approximately to a .28 ratio of demand deposits and currency to G.N.P.

During the same period, 1908-1918, rates of interest kept increasing and the difference between long-term and short-term interest rates increased, especially during the war years. The premium on short-term rates increased, which indicates a decrease in the preference for liquidity. In 1919, the difference between the two rates was .80%, thus about 18% of an interest rate of 4.75%. This is considerably above the 4.7% of an interest rate of 4.75% which was stated as corresponding to sizable cash balances in our illustrative case (1). The level of cash balances (ratios .28 and .48 on the income velocity chart) corresponded to the transaction needs for cash balances and not to a speculative holding of cash balances.

In the period 1908-1918, cash balances and liquidity preference decreased and practically no speculative cash balances were held. During the whole period, the cost of reinvesting made long-term securities attractive to buyers, while sellers liked the flexibility in and out of short-term securities. Until 1908, the narrowing of the gap between short and long-term rates indicates that suppliers were less reluctant to borrow on a longer term basis and investors increased their holdings of short-term securities more than their holdings of long-term. On the contrary, from 1908 to 1918, inflation led investors to prefer real assets to money assets and long-term to short-term securities, while suppliers tended to borrow exclusively short-term. Then the liquidity premium on short-term rates increased significantly, while all interest rates increased.

1919 - 1929

The first period studied, 1890-1918, seems to fit into the classical conception of negligible speculative cash balances and not into Keynes' fear of hoarding. The 1920's, as regards liquidity, are characterized by two violent speculations, in 1920 and in 1929, and generally by a growing liquidity preference between these two periods.

In 1919-1920, the amount of transactions cash balances did not increase, but the velocity (rate of turnover) of demand deposits increased slightly. This indicates more active transactions. But the important fact is that demand deposits were not affected by the speculative movement out of cash. On the contrary, the ratio of all deposits/G.N.P. decreased sharply, indicating a rather important decline of time deposit balances. At the same time, prices rose very sharply. It is likely that during this period many investor avoided time deposits and cash

balances to hold real assets, and especially commodities whose prices rose considerably. Stocks of raw materials were not put into production by those who held them, but kept idle in the expectation of a rise in prices. Moreover, prices were expected by those who held speculatively real commodities to increase enough to offset the carrying and storage costs of maintaining high inventories. This, "per se," doesn't indicate any change in liquidity preference. It corresponded to a belief that, since prices rose, money could no longer be considered the most liquid holding, but that commodities were more liquid than money. Thus, investors shifted from monetary liquidity to real liquidity.

But another factor indicates that during the year 1919 the liquidity preference of individuals sharply declined. All interest rates increased and the gap between long and short-term yields increased considerably. Basic yields of short-term securities, in 1921, were the highest since 1873, 7%. It reflects a very low liquidity preference, since it corresponds to a much smaller demand for liquidity. The difference between the long-term and the short-term yield, 1.77%, corresponds to nearly 30% of 5.17%, the highest liquidity premium found during the period considered. Such a sizable liquidity premium corresponded, no doubt, to a negligible amount of speculative cash balances. This is consistent with the income velocity of money (ratios .28 and .46 in 1920, while income cash balances amount generally to .28 and .50).

Briefly, this speculation of the year 1920 was characterized by the negligible cash balances for speculation purposes, by low liquidity preference corresponding to an expectation of fall in interest rates, by preference for real commodities and long-term securities, and by suppliers of funds issuing short-term.

From 1920 to 1928 the situation changed considerably. The ratio of money supply/G.N.P. rose from .46 to .60 while the ratio of demand deposits and currency/G.N.P. remained stable at .28. This indicates, as we have stated earlier, that speculations in cash balances affect time deposits while demand deposits generally correspond to transactions need. The rates of turnover showed the same tendency. The velocity of demand deposits increased during the 1920's, corresponding to an increase in economic activity, while the velocity of time deposits decreased, corresponding to growing cash balances. Moreover, speculation out of real goods stocks and in time deposits occurred in 1921; such speculation was, then, purely a matter of circumstances and did not correspond to any trend. Such an increase in time deposits balances may be explained by the fall in the level of prices during the 1920's, which made it advantageous to hold cash rather than real goods.

However, the study of interest rates tells a somewhat different story. Both interest rates fell, which would correspond to small cash balances. It seems that investors during the 1920's were expecting interest rates to rise soon, and then to either hoard or demand short-term securities. At the same time, the eagerness of investors to invest in short-term securities, due to a considerable increase in savings, reduced the gap between short-term and long-term rates. The premium on short-term rates decreased constantly until 1925, when a premium actually existed on long-term rates; then from 1926 to 1928, short-term and long-term rates were equal. The liquidity preference, as the disappearance of the liquidity premium reflects, increased considerably during the 1920's. Increase in savings, expectation of a rise in interest rates, and perhaps the growing importance of banks and financial institutions which tended

to lower the short-term interest rate, may have been the motivating factors in such a situation.

Finally, in 1929 a very important speculation occurred. The ratios of money supply to G.N.P. declined sharply, showing a shift from cash balances to securities. At the same time, the velocity of money increased, especially in New York City where it reached tremendous proportions. It seems that the investors, realizing that the possibilities of short-term profit were very high, abandoned their expectation of a future rise in interest rate, which had never materialized during the 1920's. Therefore, they shifted from short-term to long-term, causing the short-term rate to rise. A considerable premium on short-term securities was then offered on the market, .85%, which corresponds to nearly 25% of 4.5%, which was the existing long-term rate. The sudden decline in liquidity preference and in cash balances during the year 1929, had, then, very significant consequences on the level of interest rates. Such a decline of liquidity preference may be attributed to two factors. First, the long-term interest rate increased in 1928-1929, due to very large profits and to a decline in prices; this induced investors to buy long-term securities since they were expecting interest rates to decline in the future. In the second place, the expectation of the decline in interest rates itself caused the liquidity preference to decline.

During this decade of the 1920's, speculative movements in and out of cash were significant. The liquidity preference, if we neglect the years 1919 and 1920, which were very special, served to hold the interest rates down while people expected them to rise. The same liquidity preference, due to speculation, brought the short-term interest rate down to the long-term level, then suppressed the previous liquidity premium

on short-term rates. Thus, an increasing liquidity preference during the 1920's was a stabilizing factor on interest rates and on prices. However, the potential instability resulting from high cash balances in the case of a sudden change in anticipations did occur. The speculation of the year 1929, which affected particularly short-term interest rates, was not an unimportant factor in aggravating the consequences of the breakdown of October, 1929.

1930 - 1941

The years 1929-1941 correspond to the economic and monetary crisis of the 1930's. Generally speaking, they are characterized by a considerable amount of cash balances and a very high liquidity preference.

First, from 1929 to 1932, the ratios of money supply/G.N.P. increased considerably, from .53 to .78 and from .25 to .35. The amount of cash balances also considerably increased and, at the same time, the velocity of money decreased. This can be explained, first, by an increase in actual cash relative to desired cash, due to the breakdown of the economy. Such a factor might have been significant for the year 1930, but can not explain a more important trend. A high preference for liquidity was the motivating factor, accentuated by the fall in prices and the deflation that made money preferable to other assets. The influence of deflation on liquidity preference and on the level of cash balances can not be over-emphasized.

At the same time, interest rates fell, causing the prices of securities to increase. But the preference for liquidity was such that a premium on long-term rates of about 1% appeared on the market. Corporations waited to issue bonds, which caused the interest rates to go even

further down, and individuals hoarded, which had the opposite effect on interest rates. In fact, the yields increased temporarily, in 1931-1932, but the general tendency was for interest rates to go down. Since the investors were too insecure to buy long-term, as they would have under other circumstances, they bought short-term securities, which tended to make the short-term interest rate decline. Liquidity preference, then, had an erratic effect on interest rates.

From 1932 until 1941, except during the years 1937-1938, the level of prices increased. This increase in price diminished the premium on hoarding and caused the level of speculative balances to decrease from .78 to .51 and from .35 to .33 in 1942. At the same time, the velocity of money declined slightly, which shows that there was still a considerable amount of cash balances.

From 1930 on, the short-term interest rate was below the long-term rate by a considerable amount, slightly above 2%. Such a factor indicates a very high liquidity preference, which was caused more by risk aversion than by an expectation of rise in interest rates. In fact, from 1932 to 1941, interest rates constantly fell. Corporations were encouraged to issue short-term securities. Normally that would have induced the short-term interest rate to rise, but the liquidity preference of investors was such that it could not produce this result.

Moreover, the insecurity of investors was such that cash balances were kept in the form of demand deposits more than in the form of time deposits.

Briefly the general tendency of the 1930's was a high level of cash balances in time deposits, a high liquidity preference which kept the short-term interest rate below the long-term rate, and an expectation of a future fall in interest rates.

1942 - 1955

The decade of the 1940's shows changes in liquidity opposite to those of the preceding decade. The striking fact, in comparing the post World War I period and the post World War II period is the decreasing importance of speculation and the constancy of the trends in interest rates and in velocity of money.

From 1941 to 1946, the liquidity of the American economy was mostly due to the war. The ratios of money supply/G.N.P. reached their top level in 1946 (.81 and .50). However, this reflects an increase in the money supply more than an increase in the desire for cash balances. Monetary policies, rather than investors' desires, were the cause. However, a tendency existed to increase time deposits balances more than demand deposits balances. Further proof that monetary authorities, and not liquidity desire, have induced cash balances to increase can be found by studying the velocity of money. From 1941 to 1946 the velocity of money decreased and stabilized at a very low level in 1945-1946. The increase in the rate of turnover in New York City may be attributed to the reanimation of New York as a financial center.

During the same period long-term interest rates kept declining. Increase in demand, due to large cash balances, and the decline of the liquidity preference caused this decline. Moreover, the rise in short-term interest rates reflected the decline in liquidity preference. The gap between short and long-term interest rates, 3.5% in 1941, was only 2% in 1946. A fact that shouldn't be neglected during this period is the growing importance of governmental financial agencies with a relatively high level of cash balances.

Briefly, the period from 1941 to 1946 can be characterized by increasing cash balances and decreasing liquidity preference.

The postwar period is characterized by a considerable decline in cash balances (from .81 to .53 and from .50 to .34). The amount of time deposits increase relative to total deposits. It can be noted that speculative holdings of cash are usually made in time deposits, as happened during the two slumps of 1948-1949 and of 1953-1954, when time deposits balances increased, reflecting a growing liquidity preference. Another important fact is the small amount of speculative movements in cash balances. Cash balances present long-run trends.

On the side of interest rates, a decreasing liquidity preference appears, since the premium on long-term interest rates tends to be narrowed. Moreover, both interest rates have a general tendency to rise, which induces investors to buy long-term securities while suppliers issue short-term securities. The difference between the two rates, 2% in 1946, i.e., 65% of an interest rate of 3%, was a considerable incentive for suppliers to issue short-term. The very fact that the long-term interest rate did not rise considerably may be attributed to this tendency of suppliers to restrain from long-term securities. In 1955, however, the difference was only 1.2%, i.e., 30%. This is still a considerable incentive to keep short-term liabilities.

It seems that an institutional factor has been particularly important in maintaining a relatively higher liquidity preference than expected from the investors. Banks, financial institutions, and insurance companies form a growing part of economic life. Traditionally, because of regulations, they keep a very large part of their assets in liquid form, and thus, tend to keep the short-term interest rate down. No doubt, without the existence of this institutional factor, the short-term interest rate would have been much higher than it actually is.

The slump of 1953-1954 had a rather significant effect on interest rates, bringing them down occasionally, and above all, increasing the gap between long and short-term rates.

Finally, a comparison might be made between the 1920's and the 1940's. While during the 1920's liquid balances increased, during the second post-war period they decreased. The amount of these balances was considerably more stable in the 1940's and 1950's. The absolute amount can be compared, showing higher demand deposits balances in the present than in the 1920's. The same impression of stability is reflected by the chart on interest rates. The level of interest rates is much lower than in the 1920's and the liquidity preference is higher. Moreover, the actual liquidity preference is due to institutional factors, while in the 1920's it was due to speculation. The fragility of the economy, due to liquidity, then, was much greater in the 1920's than it is in present times.

Several conclusions may be drawn concerning the behavior of cash balances and interest rates during the first part of the twentieth century. First, the total deposits balances, relative to income, increased until 1908 (.55), then decreased until 1920 (.46). In the 1920's, after a sharp rise during 1920-1921 (.56), they increased slightly until 1928 (.60), then fell back in 1929 (.53). A sharp rise between 1929 and 1932 (.78) was followed by a continuous fall until 1942 (.51). During the war total deposits balances increased to .81, then fell in the postwar period to .53. The periods with rising total balances were the 1920's, due to speculation on future rises in interest rates, the early 1930's, due to mistrust and risk aversion, and the war years, due to a large supply of government cash.

The demand deposits balances have been, on the whole, much more

stable. Growing from 1890 (.31) to 1908 (.35), they fell to .28 in 1919 and remained at that level until 1928. In 1929 they were at .25. After a rise (1932 = .35), they leveled off around .35 until 1942. The war brought them up (1946 = .50), but following it they continually decreased until 1951 (.35), and remained at that level.

It is suggested that holding of cash balances for precautionary and speculative motives takes place in the form of time deposits and not of demand deposits. As a whole, the level of cash balances after World War II has been higher than the post World War I level. Furthermore, while this level increased in the 1920's, it decreased in the late 1940's. Such a factor was due (1) to a greater liquidity preference in the post World War I period than in the post World War II period, and (2) to an institutional increase in liquidities during World War II.

Secondly, as expected the long-term interest rate has been much more stable than the short-term rate. Basic long-term yields increased until 1921 (from 3.3% to 5.1%) then decreased continuously (except for the years 1929 and 1932) until 1946 (3%). On the other hand, short-term basic yields increased from 1908 (3.5%) to 1921 (7%), then decreased with fluctuations until 1928 (4%) to increase again in 1929 (5.2%). Short-term basic yields fell until 1936 except for the year 1932 (4%) and remained from 1936 to 1941 at the low level of .5% to .6%. After a rise, they stabilized near 1% during the war.

Liquidity preference has been a significant factor in bringing the short-term interest rate down from 1890 to 1908, during the 1920's, and during the 1930's. While the first two periods (the 1890's and the 1920's) correspond to a speculation on future interest rates, the last period (the 1930's) corresponds, rather, to a risk aversion phenomenon. Speculation brought the short-term rate high in 1920 and 1929, while optimism

in the future resulting in less risk aversion narrowed the gap between the long-term and the short-term rates after World War II.

Generally speaking, liquidity and liquidity preference had the effect of lowering and stabilizing the rates, except in the 1929-1932 breakdown when their effect was unstabilizing.

The Keynesian conception is reflected in the 1920's and the 1930's, although in different manners (speculation in the 1920's, risk aversion in the 1930's), but seems less true after World War II, due to a lessening of liquidity preference and probably even more to the consequences of a growing governmental or semi-governmental financial sector. The desire for liquidity in the post World War II period becomes more or less institutional, a possibility that did not occur to Keynes in the General Theory.

STATISTICAL APPENDIX TO CHAPTER VI

INCOME VELOCITY OF MONEY, 1889-1923

(Millions of dollars)

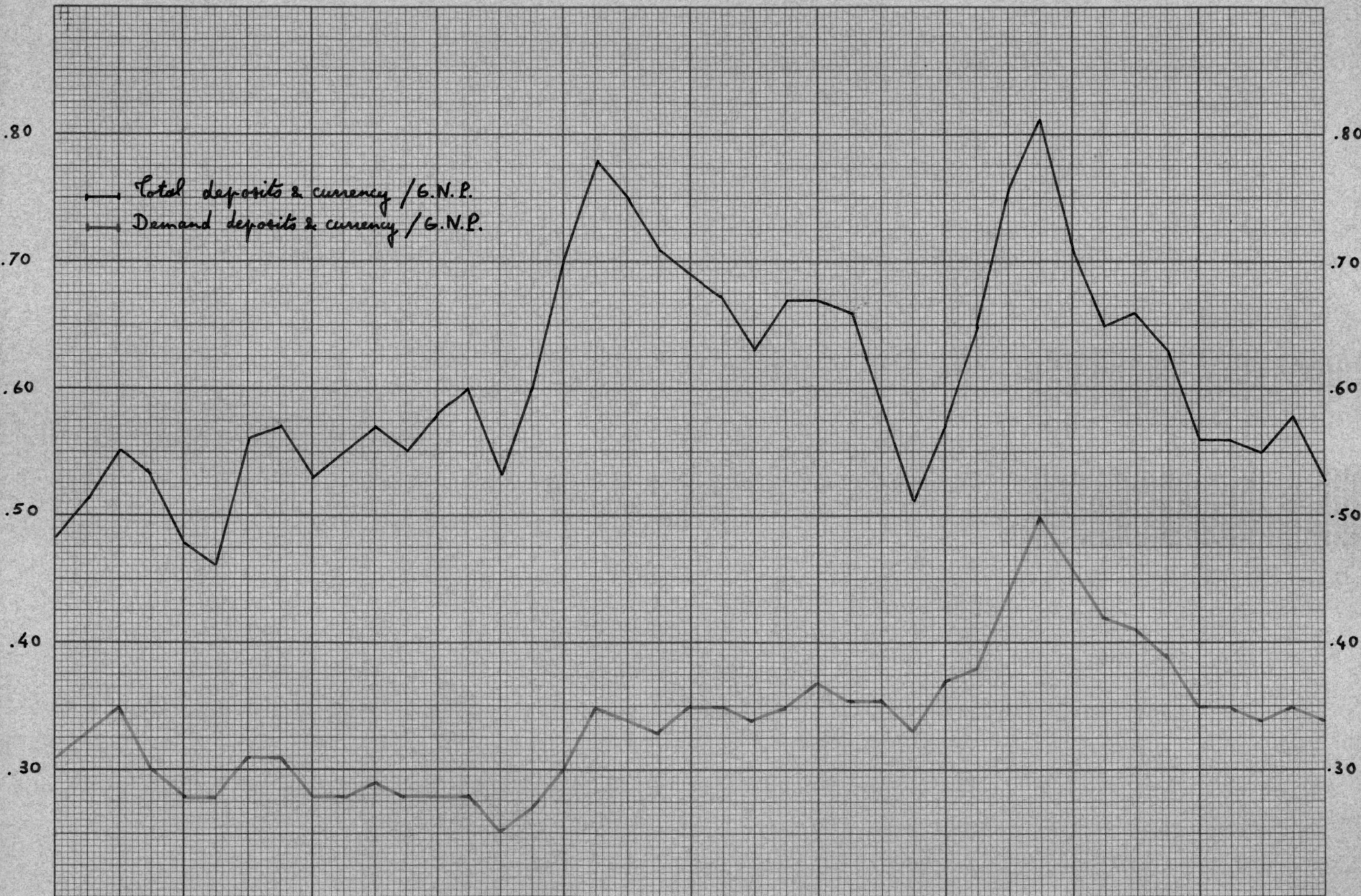
<u>Decades</u>	<u>G.N.P.</u>	<u>Money 1</u>	<u>Ratio 1</u>	<u>Money 2</u>	<u>Ratio 2</u>
1889-1898	12,730	6,116	0.48	3,961	0.31
1894-1903	15,709	8,031	0.51	5,234	0.33
1899-1908	21,584	11,836	0.55	7,679	0.35
1906-1913	28,783	15,795	0.55	9,618	0.33
1909-1918	40,122	21,329	0.53	12,252	0.30
1914-1923	61,895	31,949	0.52	18,060	0.29

Sources:

G.N.P.: Kutznets: National Product Since 1869, National Bureau of Economic Research, New York, 1946, p. 119, column 4.

Money 1 (and ratio 1): Banking and Monetary Statistics, Board of Governors of the Federal Reserve System, Washington, 1943, p. 34, column 1 (Total deposits adjusted and currency outside banks) 10 years average.

Money 2 (and ratio 2): Ibid., p. 34, column 2 (Total demand deposits adjusted and currency outside banks) 10 years average.



Ratios of Money supply over G.N.P.

1893 1894 1899 1909 1919 1920
1898 1903 1908 1918

25

30

35

40

45

50

55

INCOME VELOCITY OF MONEY, 1919-1955

(Billions of dollars)

<u>Years</u>	<u>G.N.P.</u>	<u>Money 1</u>	<u>Ratio 1</u>	<u>Money 2</u>	<u>Ratio 2</u>
1919	74.2	35.6	0.48	21.2	0.28
1920	85.6	39.8	0.46	23.7	0.28
1921	67.7	37.8	0.56	20.8	0.31
1922	68.4	39.0	0.57	21.4	0.31
1923	80.4	42.7	0.53	22.7	0.28
1924	80.9	44.5	0.55	23.0	0.28
1925	85.0	48.3	0.57	24.9	0.29
1926	91.1	50.6	0.55	25.6	0.28
1927	89.6	52.2	0.58	25.5	0.28
1928	91.3	54.7	0.60	25.9	0.28
1929	103.8	55.1	0.53	26.1	0.25
1930	90.9	54.4	0.60	25.0	0.27
1931	75.9	52.9	0.70	23.5	0.30
1932	58.3	45.4	0.78	20.2	0.35
1933	55.8	41.7	0.75	19.1	0.34
1934	64.9	46.0	0.71	21.3	0.33
1935	72.2	49.9	0.69	25.2	0.35
1936	82.5	55.0	0.67	29.0	0.35
1937	90.2	57.2	0.63	30.7	0.34
1938	84.7	56.6	0.67	29.7	0.35
1939	90.4	60.9	0.67	33.3	0.37
1940	100.5	66.9	0.66	36.7	0.36
1941	125.3	74.1	0.59	45.5	0.36
1942	159.6	82.0	0.51	52.8	0.33

<u>Years</u>	<u>G.N.P.</u>	<u>Money 1</u>	<u>Ratio 1</u>	<u>Money 2</u>	<u>Ratio 2</u>
1943	192.6	110.2	0.57	71.8	0.37
1944	210.6	136.2	0.65	80.9	0.38
1945	213.1	162.7	0.76	94.1	0.44
1946	211.1	172.1	0.81	106.0	0.50
1947	233.3	166.3	0.71	108.5	0.46
1948	259.0	169.8	0.65	108.3	0.42
1949	258.2	171.6	0.66	107.1	0.41
1950	284.2	178.6	0.63	110.3	0.39
1951	329.2	185.0	0.56	114.8	0.35
1952	346.3	195.0	0.56	121.2	0.35
1953	364.9	200.4	0.55	124.3	0.34
1954	360.5	209.3	0.58	125.2	0.35
1955	387.2	207.7	0.53	131.9	0.34

Sources:

G.N.P.: 1919-1928 Kuznets: op.cit., p. 51, column 7

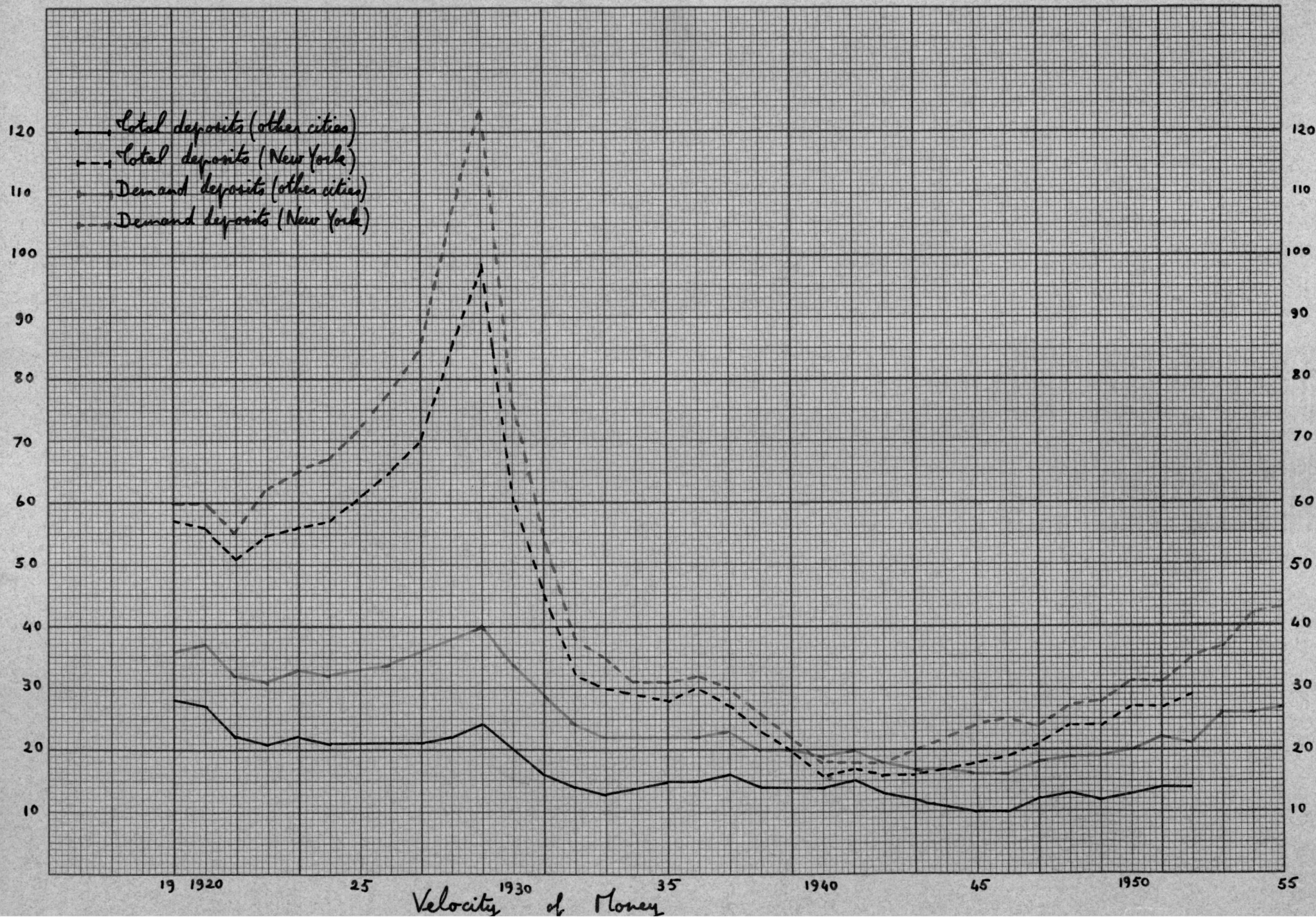
1929-1955 Department of Commerce

Money 1: 1919-1941 Banking and Monetary Statistics, p. 34, column 1.

1942-1955 Federal Reserve Bulletin, (Total deposits adjusted and currency)

Money 2: 1919-1941: Banking and Monetary Statistics, p. 34, column 2.

1942-1955: Federal Reserve Bulletin, (Demand deposits adjusted and currency)



VELOCITY OF CIRCULATION, 1919-1955

(Annual turnover rates)

Year	<u>Total Demand Deposits</u>		<u>Total Demand & Time Deposits</u>	
	<u>New York</u>	<u>Other leading cities</u>	<u>New York</u>	<u>Other leading cities</u>
1919	59.9	36.1	56.7	28.4
1920	60.0	37.3	56.0	26.9
1921	54.9	32.3	51.4	22.3
1922	61.8	31.1	55.3	21.3
1923	65.5	32.6	56.1	21.7
1924	66.5	31.8	56.8	20.8
1925	71.9	33.4	60.8	21.3
1926	77.8	34.3	65.2	21.3
1927	85.3	35.7	70.4	21.5
1928	106.3	37.6	85.3	22.1
1929	126.4	40.5	99.5	23.8
1930	77.0	33.8	61.3	19.8
1931	54.7	28.6	45.0	16.4
1932	37.6	23.9	31.7	13.6
1933	34.8	22.4	29.7	13.5
1934	31.1	22.4	27.8	14.3
1935	31.1	22.3	28.3	14.7
1936	32.2	22.4	29.7	15.4
1937	30.2	23.5	27.5	16.0
1938	25.7	20.2	23.5	13.3
1939	22.0	19.6	20.5	13.8
1940	17.6	18.8	16.5	13.7

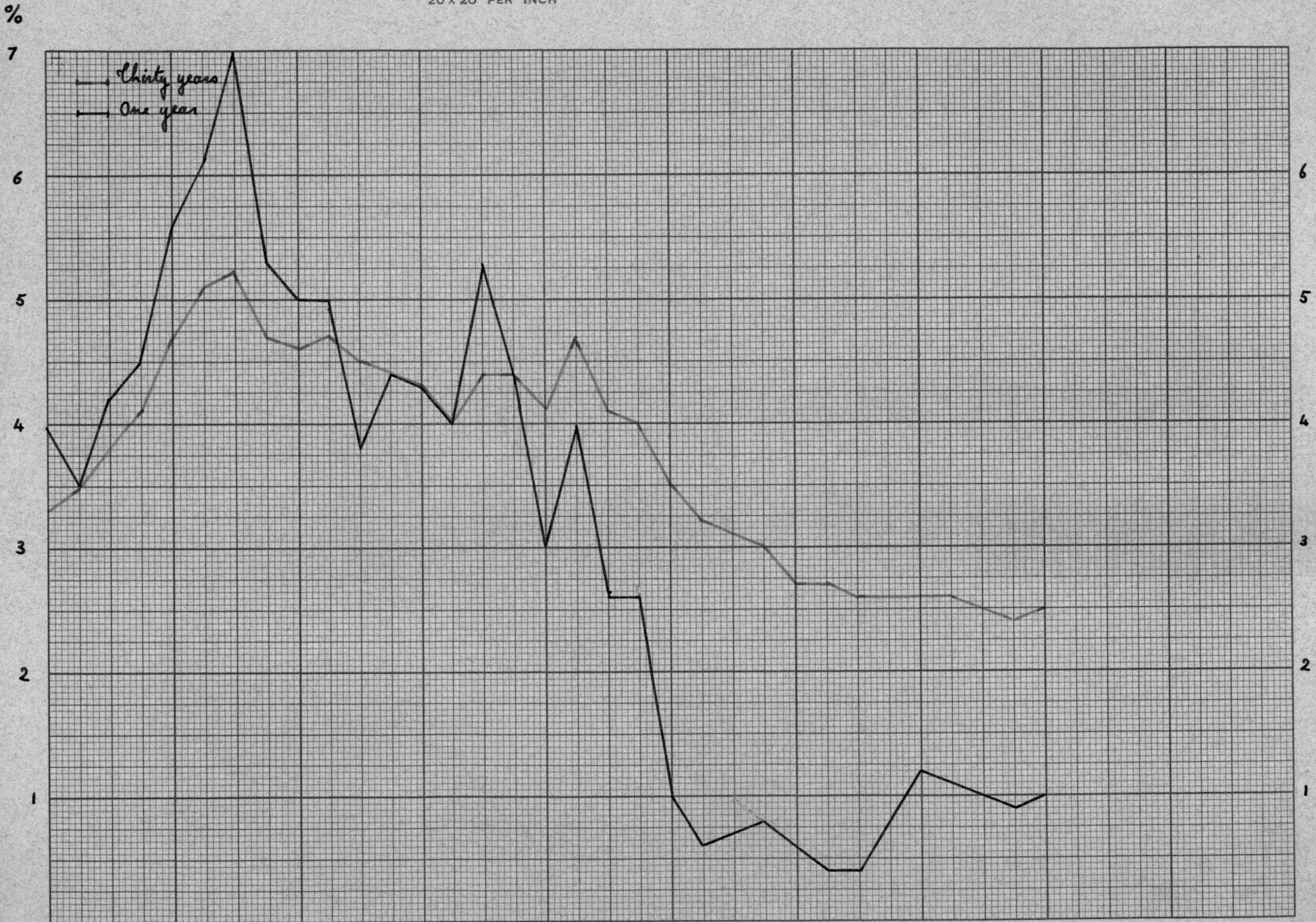
<u>Year</u>	<u>Total Demand Deposits</u>		<u>Total Demand & Time Deposits</u>	
	<u>New York</u>	<u>Other leading cities</u>	<u>New York</u>	<u>Other leading cities</u>
1941	18.0	20.2	16.9	15.3
1942	18.0	18.4	16.1	13.1
1943	20.5	17.4	16.5	11.7
1944	22.4	17.3	17.1	10.8
1945	24.2	16.1	18.3	19.7
1946	25.2	16.5	18.9	10.0
1947	24.1	18.0	21.0	11.9
1948	27.2	19.2	23.6	12.9
1949	28.2	18.7	24.1	12.4
1950	31.4	20.3	26.6	13.4
1951	31.2	21.7	26.9	14.5
1952	34.8	21.5	28.7	14.5
1953	36.7	25.6
1954	42.3	25.8
1955	42.7	27.3

Sources:

1919-1941: Banking and Monetary Statistics, p. 254 (Annual turnover rates, New York and 100 other leading cities---Weekly reporting member banks)

1942-1953: Federal Reserve Bulletin, (Annual rate of turnover of demand deposits except interbank and government---Annual rate of turnover of total deposits except interbank, New York City and 140 other centers)

1953-1955: Federal Reserve Bulletin, (Annual rate of turnover of demand deposits except interbank and government, New York City and 6 other centers)



Corporate bond basic yields by maturity

BASIC YIELDS OF CORPORATE BONDS, BY TERM TO MATURITY

(Per cent per annum)

<u>Year</u>	<u>1</u>	<u>30</u>	<u>Difference</u>	<u>Year</u>	<u>1</u>	<u>30</u>	<u>Difference</u>
1900	3.97	3.30	-0.67	1932	3.99	4.70	0.71
1905	3.50	3.50	0.00	1933	2.60	4.15	1.55
1910	4.25	3.80	-0.45	1934	2.62	3.99	1.37
1915	4.47	4.15	-0.32	1935	1.05	3.50	2.45
1919	5.58	4.75	-0.83	1936	0.61	3.20	2.59
1920	6.11	5.10	-1.01	1937	0.69	3.08	2.39
1921	6.94	5.17	-1.77	1938	0.85	3.00	2.15
1922	5.31	4.71	-0.60	1939	0.57	2.75	2.18
1923	5.01	4.61	-0.40	1940	0.41	2.70	2.29
1924	5.02	4.66	-0.36	1941	0.41	2.65	2.24
1925	3.85	4.50	0.65	1942	0.81	2.65	1.84
1926	4.40	4.40	0.00	1943	1.17	2.65	1.48
1927	4.30	4.30	0.00	1944	1.08	2.60	1.52
1928	4.05	4.05	0.00	1945	1.02	2.55	1.53
1929	5.27	4.42	-0.85	1946	0.86	2.43	1.57
1930	4.40	4.40	0.00	1947	1.05	2.50	1.45
1931	3.05	4.10	1.05				

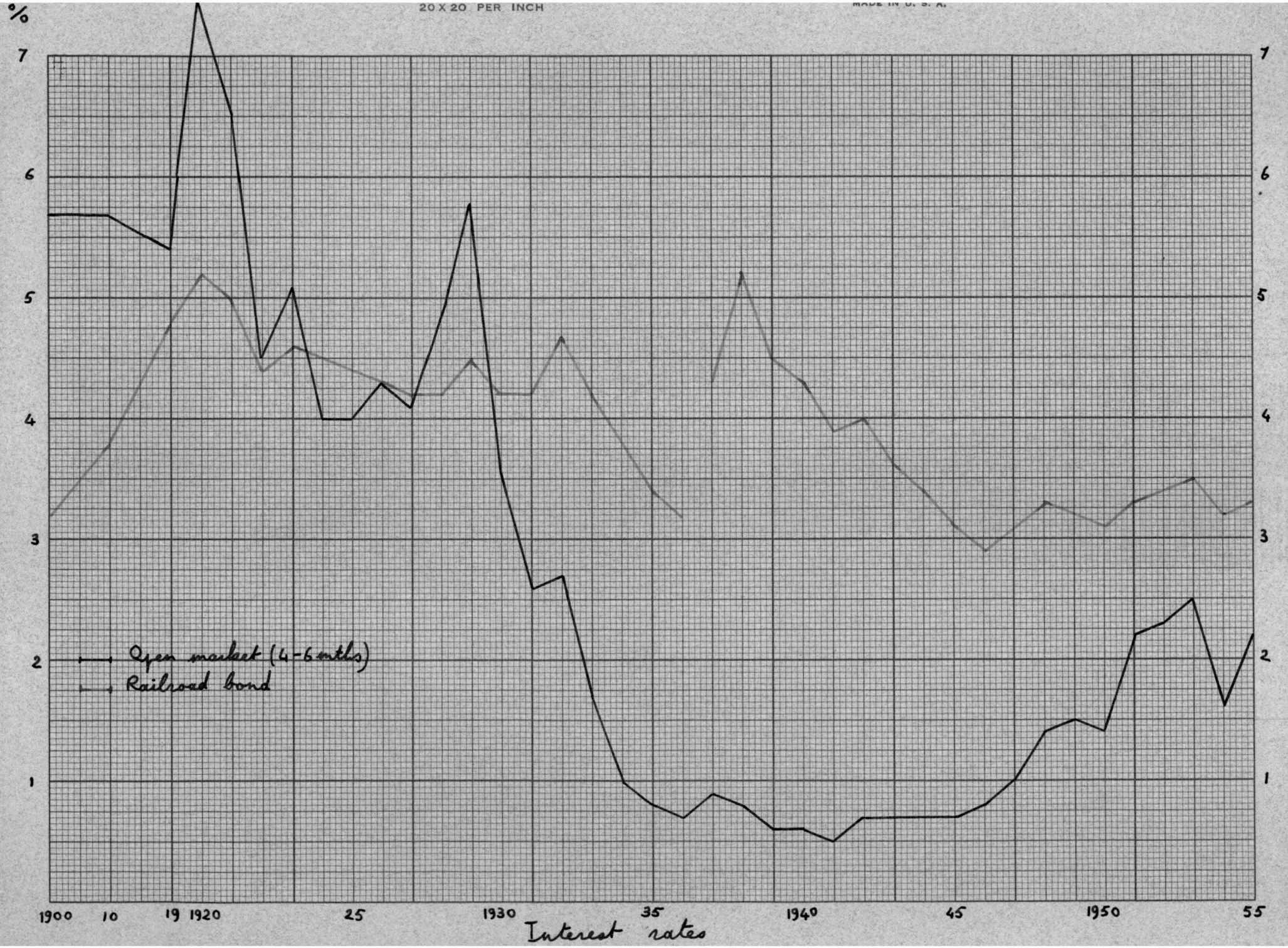
Sources:

1900-1942: David Durand: Basic Yields of Corporate Bonds, 1900-1942,

National Bureau of Economic Research, New York, 1942, pp. 5-6.

1943-1947: David Durand and W.J. Winn: Basic Yields of Bonds, 1926-1947,

National Bureau of Economic Research, New York, 1947, p. 14.



%

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1900 10 19 1920 25 1930 35 1940 45 1950 55

Interest rates

Open market (4-6 months)
Railroad bond

LONG AND SHORT-TERM INTEREST RATES, 1919-1955

(Percent per annum)

<u>Year</u>	<u>Long-term</u>	<u>Short-term</u>	<u>Year</u>	<u>Long-term</u>	<u>Short-term</u>
1919	4.72	5.37	1938	5.21	0.81
1920	5.17	7.50	1939	6.53	0.59
1921	4.98	6.62	1940	4.30	0.56
1922	4.39	4.52	1941	3.95	0.54
1923	4.58	5.07	1942	3.96	0.66
1924	4.51	3.98	1943	3.64	0.69
1925	4.45	4.02	1944	3.39	0.73
1926	4.33	4.34	1945	3.06	0.75
1927	4.17	4.11	1946	2.91	0.81
1928	4.23	4.85	1947	3.11	1.03
1929	4.48	5.85	1948	3.34	1.44
1930	4.25	3.59	1949	3.24	1.48
1931	4.18	2.64	1950	3.10	1.45
1932	4.66	2.73	1951	3.26	2.17
1933	4.22	1.73	1952	3.36	2.33
1934	3.82	1.02	1953	3.55	2.52
1935	3.44	0.76	1954	3.25	1.58
1936	3.23	0.75	1955	3.34	2.18
1937	4.34	0.94			

Sources:

Long-term: 1919-1936: Banking and Monetary Statistics, p. 478, (Yields of high-grade railroad bonds---yearly average)

1937-1955: Federal Reserve Bulletin, (Bond yields---Corporate Moody's by groups Railroad---yearly average)

Short-term: 1919-1941: Banking and Monetary Statistics, p. 448,
(Short-term open-market rates in New York City, yearly average, Prime
commercial paper, 4 to 6 months)

1942-1955: Federal Reserve Bulletin, (Open-market rates
in New York City, yearly average, prime commercial, 4 to 6 months)

LONG AND SHORT-TERM RATES ON U.S. GOVERNMENT SECURITIES, 1947-1955

(per cent per annum)

<u>Year</u>	<u>Bills</u>	<u>Bonds</u>	<u>Difference</u>
1947	0.60	2.25	1.65
1948	1.04	2.44	1.40
1949	1.10	2.31	1.21
1950	1.20	2.32	1.12
1951	1.52	2.57	1.05
1952	1.72	2.68	0.96
1953	1.90	2.93	1.03
1954	0.94	2.53	1.59
1955	1.73	2.80	1.17

Sources:

Bills: Federal Reserve Bulletin, (U.S. Government taxable 3 months
bill, market rate)

Bonds: Ibid., (U.S. Government long-term securities, old series)

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Articles marked * have not been consulted for this study by the writer.

Typist: Diane Jepsen

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