

Maturity of Negotiable CD's at District Banks

by Arnold A. Dill

The negotiable certificate of deposit (CD) has become an increasingly important source of funds to District banks. At 23 large District banks, the volume outstanding in denominations of \$100,000 or more doubled from \$850 million at the end of 1970 to \$1,743 million at the end of 1972. During the same period, CD's rose from 7.3 to 12 percent of total liabilities at these banks. CD volume at other District banks has also been rising rapidly and is estimated to total over \$1 billion.

One little-publicized aspect of this expansion is CD maturity distribution. Yet maturity decisions can have important effects on a bank's interest expenses and liquidity.

These decisions affect interest expenses because CD rates are volatile and vary with maturity. In the past two and one-half years, these rates, in concert with other money market rates, have changed direction four times and have shifted by as much as one percent in a single month. Therefore, depending on the timing of CD issues and redemptions, interest expenses—and their effect on earnings—can change greatly. Banks which manage to group certificate issues when rates are down will have lower interest expenses than banks that do not.

In the past two years, CD's maturing in 30 to 59 days have yielded as much as 1½ percent below those maturing in one year. Given such differences, the pattern and level of a bank's interest expenses will be affected by the maturity of certificates it issues.

CD maturity also affects a bank's liquidity. Maturing certificates must be either refinanced by new issues or increases in other liabilities or else offset by asset sales or loan reductions. The shorter the average maturity of a bank's outstanding CD's, the greater near-term refinancing problem it confronts. Also, the shorter the average maturity, the more often CD's will turn over and the more interest expenses will reflect the volatility of rates. It must be disconcerting to some District bankers that at times over 20 percent of their total liabilities has been interest-sensitive, short-maturity CD's. At the same time, some of those bankers have relied heavily on overnight borrowing in the Fed funds market.

Calculation and Behavior of CD Maturity

The average maturity statistic is calculated from monthly data submitted by 23 large District banks. Each bank reports the dollar volume of CD's maturing in

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WHAT IS A NEGOTIABLE CERTIFICATE OF DEPOSIT?

A negotiable CD is a marketable receipt for funds deposited in a bank for a specific time and rate of interest. Most are issued in denominations of \$100,000 or more and in maturities of six months or less. An active secondary market enables the selling of certificates prior to maturity. Most CD's are purchased by sophisticated investors such as corporations, state and local governments, financial institutions, and wealthy individuals. To attract such investors, banks must offer CD rates competitive with those on other money market instruments such as Treasury bills and commercial paper.

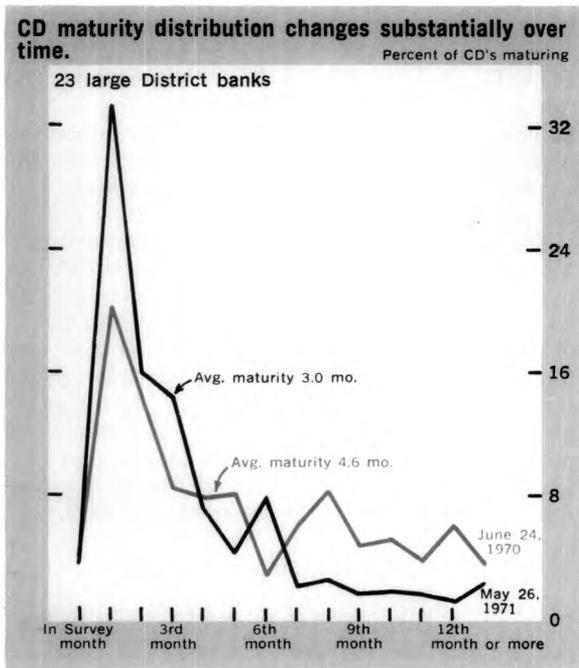
each of the next 12 months; these data are totaled for the District maturity distribution (Chart I). Average maturity is then calculated on a weighted average basis. (See Appendix I for details and sample calculation.)

Average CD maturity has ranged from a high of 5.0 months in August 1965 to a low of 2.7 months in December 1969 (Chart II). At some banks, it has ranged from over six months to less than one month. Average CD maturity has also shown sizable month-to-month fluctuations.

CD maturity trended downward from 1965 to 1969. Then, after rebounding in early 1970, maturity declined and in 1971 and 1972 fluctuated around a relatively low 3.2 average.

Average maturity also seems to follow a seasonal

CHART I

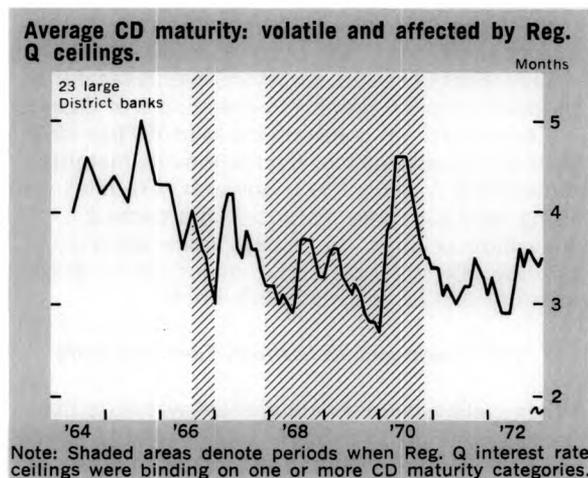


pattern. Except for 1972, maturity has declined in the last three months of each year. This pattern occurs because a large amount of District CD's are issued to mature in December. In fact, as high as 20 percent of certificates outstanding at the end of November have been scheduled to mature around mid-December. Businessmen apparently have a large need for cash at that time to make tax and dividend and other payments. However, banks have usually been successful in reissuing CD's in mid-December and dollar volume normally has not declined substantially.

Rate Ceilings Have Big Impact

Under Regulation Q, the Board of Governors sets maximum interest rates banks can pay on various maturity CD's. Whenever rates on compet-

CHART II



ing money market instruments have eclipsed CD rate ceilings, banks have been severely constrained from bidding for certificates, and volume and maturity have declined.

Rate ceilings first affected CD maturity during the credit "crunch" in the latter half of 1966. Money market rates began to move above ceilings about midyear, precipitating a sharp CD runoff. During this period, average maturity declined from four to three months.

A decline in money market rates in early 1967 again allowed banks breathing room under ceilings. A large volume of moderately long CD's were issued and average maturity increased. By November 1967, however, rising money market rates were again restricting banks from competing for CD's maturing in over 90 days. As a result, average maturity of new issues was very low in late 1967 and early 1968.

On April 18, 1968, the Board of Governors raised ceilings on maturities of 60 or more days,

allowing banks to compete for longer CD's. The maturity of new issues then rose sharply. As 1968 drew to a close, however, competitive money market rates once again were rising above rate ceilings on all maturities. As ceilings remained in effect throughout 1969, CD volume plunged and average maturity fell to a record low of 2.7 months.¹

The Board of Governors again raised ceilings on January 21, 1970, enabling banks to compete for CD's maturing in 270 days or more. As a result, sales picked up and the average maturity of new issues rose to an all-time high early in the year. However, two developments in early 1970 abruptly reversed this striking maturity rise. First, interest rates on competitive money market instruments turned up after mid-April and began to eclipse rate ceilings on longer-maturity CD's. Because of this, CD sales declined after April and average maturity leveled off. Then, on June 27, 1970, the Board of Governors suspended rate ceilings on certificates maturing in 30 to 89 days. Sales picked up sharply in July and August, but this time banks were selling mainly short CD's and, therefore, average maturity dropped from 4.6 months in June to 3.5 in October.

Ceilings did not constrain banks in 1971 or 1972 and, as a consequence, fluctuations in maturity diminished. In early 1973, however, CD rates were rising, and for some maturities approached prevailing ceilings. As ceilings once again become effective on some maturities, average maturity should be greatly influenced.

The Importance of Maturity Considerations

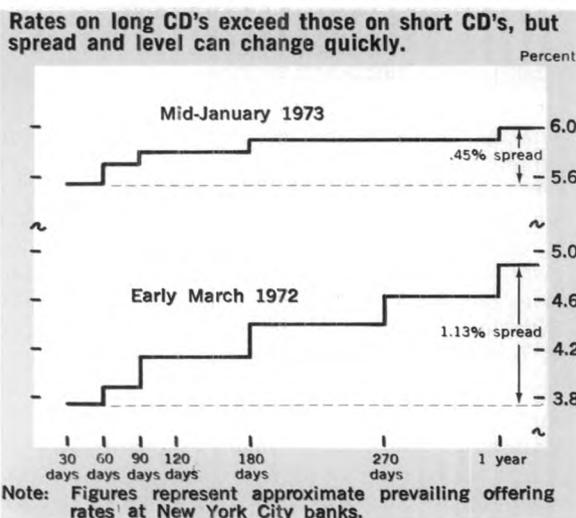
When ceilings were binding, there was little that banks could do to influence CD maturity. During such times, most banks stood ready to issue, at ceiling rates, all the CD's of any maturity that they could. However, even when free of ceilings, only a few large District banks have made maturity an important consideration in liability management.

These banks typically estimate the volume of funds they will need to raise in the money market over some future period. Then they adopt a strategy regarding liability mix and maturity, aimed at minimizing the cost of obtaining these funds subject to some liquidity constraint. In conjunction with this, these banks develop a plan to maximize returns on their investment trading accounts and portfolios.

The optimum liability strategy depends to a large extent on the outlook for Fed funds and CD interest

¹CD maturity during 1969 is biased upward by CD's issued by large Tennessee banks. Beginning in April of that year, these banks were allowed to pay more than 4-percent interest on CD's. When Tennessee banks adjusted their rates from 4 percent to the Federal Reserve rate ceilings (ranging from 5 1/4 percent on 30-59 day maturities to 6 3/4 percent on one year or longer maturities), they attracted an inflow of CD's at the same time other District banks were rapidly losing them. The average maturity of outstanding CD's rose at Tennessee banks in 1969, contrary to behavior elsewhere in the District.

CHART III



rates and the prevailing maturity structure of CD rates. Generally, if a bank foresees a rise in these rates, it will try to issue long maturities to lock in prevailing rates. For the same reason, a bank may increase its desired CD volume and cut purchases of overnight Fed funds. Conversely, when a bank expects rates to fall, it will avoid issuing long maturities and may also let CD's run off and increase Fed funds purchases.

A bank must also weigh its interest rate forecast against the current maturity structure of CD rates. Banks usually have to offer an interest-rate premium to induce investors to extend maturity, and this premium is large when rates are expected to rise. This was true in March 1972, for example, when rates were about 1 1/8 percent higher on one-year CD's than on those maturing in 30 to 59 days (Chart III). In this case, a cost-minimizing bank would issue a one-year CD only if it thought short-term rates would be rising substantially during the next year.

Several bankers interviewed did not feel that the 1 1/8 percent premium prevailing in March 1972 was justified. In other words, they thought interest costs over the coming year would be minimized by issuing a succession of short CD's rather than one long one. This partly explains the low average maturity figures in the first half of 1972. As the year progressed, the premium on long CD's shrank and more bankers probably felt that the cost of lengthening maturity was justified. This may explain the rise in maturity in the latter half of 1972.

The Puzzle of Interbank Differences

CD maturity behavior differs widely among banks. For instance, among the 12 largest CD issuers in the District, the average of maturity in 1971 ranged

from 4.0 months to 2.2 months. Maturity has trended up at some banks and down at others and varied in volatility.

One might suspect that banks with conservative management philosophies would have longer CD maturity than more aggressive banks. And it is true that, among the 12 largest CD issuers, one conservative bank has consistently had the longest average maturity. Aside from this, however, maturity behavior seems to bear little relationship to management philosophy. Also, over time, there has been no significant correlation between average maturity and bank size, CD volume, ratio of CD's to total deposits, or portion of CD's issued to state and local governments.

Maturity Will Be Increasingly Important

Most large banks interviewed expect the negotiable certificate of deposit to become an even more important source of funds. They forecast growing credit demands that will provide a profitable outlet for CD funds. As a result, competition for CD's will likely increase and more banks will begin to issue them. As the liquid funds of state and local governments, businesses, and individuals grow, the potential supply of CD funds should also rise rapidly. In addition, District banks have been improving access to national money markets by issuing CD's to investment bankers in New York who, in turn, distribute them to investors. CD's issued by District banks could become even more attractive as the secondary market in these instruments develops, increasing their liquidity.

As the CD grows in importance as a source of funds, so will CD interest costs grow in importance in total bank expenses. As this happens, bankers will devote greater attention to CD management and better appreciate the earnings and liquidity implications of maturity.

Several banks in the District are already in the process of increasing the sophistication of their liability management, including CD policies. As District bankers delve into the economics of liability management, they can be expected to ask several questions about CD maturity:

1. What is the minimum CD maturity one can prudently have?
2. What maturity strategy will minimize the average interest cost of CD funds over a given period?
3. How much would be added to interest costs over a given period if CD maturity is extended?

Because maturity affects bank costs and liquidity, the answer to the first question is important. Especially when rate premiums on long maturity CD's are larger than bankers think justified, they will be tempted to keep maturity very short to cut interest expenses. Conversely, they may worry

about becoming too dependent on short CD's.

The question of minimum maturity can be answered only after analyzing a bank's overall liquidity and objectives. CD maturity should be considered only along with the following factors: maturity of other liabilities; total reliance on interest-sensitive funds; the quality, liquidity, and maturity of assets; and the ability of the bank to raise funds in the money markets. Regarding this last point, most money managers at large District banks have grown increasingly confident of their ability to place CD's and other money market liabilities at their discretion. Also, they say that once they have incurred the development cost of establishing their CD-issuing and Fed-funds borrowing capabilities, operating costs are little affected by changes in the maturity or composition of money market borrowing.

However, bankers are apt to become uneasy (and so might bank regulators) if a further CD expansion should significantly reduce the average maturity of bank liabilities, especially if there is not a compensating fall in the average maturity of bank assets. The more asset maturity exceeds liability maturity, the greater the potential for interest costs to deviate from interest income. A bank with short liability and long asset maturity experiences more rapid increases in interest expenses than interest income when rates rise. At the same time, the capital value of a bank's investments would likely decline and customer loan demands would intensify. Because of these risks, it might be assumed that bankers would try to maintain a reasonable balance between asset and liability maturity, perhaps by increasing the average level of CD maturity from the low levels of 1971 and 1972. However, as bankers continue to grow more confident of their ability to issue CD's at will, they will be tempted to keep maturity short if they think this will significantly reduce costs.

Turning to the second question, development of a cost-minimizing CD strategy requires a projection of the interest rates needed to attract various maturity CD's over a given planning period. Given such a projection, it would be relatively easy to simulate various maturity strategies and determine the minimum cost strategy (see Appendix II), though, of course, this strategy would have to be revised each time interest rate projections were updated.

Once a projection of CD rates has been made and the interest-cost-minimizing strategy determined, the question of the least expensive way of extending maturity could be calculated with relative ease (see Appendix II). An array of average interest costs and associated CD maturity could be developed to illustrate the cost of extending maturity and for use in arriving at an optimal combination of interest cost and maturity. Getting answers to the above questions should prove well worth the cost. ■

APPENDIX I

**Calculation of Average Maturity of Outstanding
Negotiable CD's**

On the last Wednesday of each month, 23 large District banks report to the Federal Reserve Bank of Atlanta the dollar volume of outstanding negotiable CD's in denominations of \$100,000 or more that mature in the remaining days of the survey month and in each of the next 12 months or more. These data are then aggregated for District totals published along with an average maturity statistic in this Bank's release entitled "Maturity Distribution of Outstanding Negotiable Certificates of Deposit." These data are forwarded to the Board of Governors where they are combined with data from other Districts and published in the Federal Reserve statistical release G.9.

Average maturity is calculated on a weighted average basis. All CD's are assumed to mature in the middle of the month. Those maturing in the survey month are

assumed to mature in the middle of the period between the survey date and the end of the calendar month in which the survey is taken. The weights are the percent of outstanding CD's maturing in each month or fraction thereof; starting date for calculations is the survey date.

A downward bias in calculated average maturity develops because all CD's maturing in more than 12 months after the survey date are lumped together. These are assumed to mature in the middle of the twelfth full month after the survey date, regardless of their actual, but unknown, maturity. In some cases, this formula can seriously understate maturity at individual banks. For example, one District bank recently issued a \$10-million negotiable CD to mature in 10 years. Such a CD is treated as maturing in 12.5 months under the current formula.

**Sample Calculation
Sixth District, December 27, 1972**

	Period of Maturity	Maturity Distribution		Maturity Multiplier* (B)	(A) × (B) / 100
		Mil. \$	Percent (A)		
1972	Remainder of December	66.1	3.8	4/31 × 1/2	.0025
1973	January	559.3	32.2	4/31 + 1/2	.2025
	February	222.8	12.8	(4/31 + 1/2) + 1	.2085
	March	219.5	12.6	(4/31 + 3/2) + 1	.3313
	April	108.4	6.2	(4/31 + 5/2) + 1	.2250
	May	86.0	4.9	(4/31 + 7/2) + 1	.2268
	June	120.5	6.9	(4/31 + 9/2) + 1	.3884
	July	77.9	4.5	(4/31 + 11/2) + 1	.2983
	August	46.0	2.6	(4/31 + 13/2) + 1	.1984
	September	55.1	3.2	(4/31 + 15/2) + 1	.2761
	October	44.2	2.5	(4/31 + 17/2) + 1	.2407
	November	42.8	2.5	(4/31 + 19/2) + 1	.2657
	December	33.9	1.9	(4/31 + 21/2) + 1	.2210
1974	January or later	60.1	3.4	(4/31 + 23/2) + 1	.4494
	Total	1,742.6	100.0		3.5346 = average maturity

*Formulas for maturity multipliers:

- December = midpoint of the remainder of December = $\frac{\text{remaining days of December}}{\text{days in December}} \times \frac{1}{2}$
 - January = midpoint of January = portion of December remaining + $\frac{1}{2}$
 - February = midpoint of February = midpoint of January + 1
 - March = midpoint of March = midpoint of February + 1
- etc.

APPENDIX II

Maturity Strategy to Minimize the Interest Cost of a Given Volume of CD's

A projection of the interest rates needed to attract various maturity CD's to a bank is necessary to develop the cost-minimizing maturity strategy. Whether or not the strategy would actually minimize costs depends on the accuracy of the rate forecast. The strategy would have to be revised each time the interest rate projection was updated.

Given the hypothetical projection in Table 1 for a future year, various maturity strategies can be tried and average monthly interest cost calculated. In this case, interest costs would be minimized by issuing a series of three 30-day maturity CD's beginning January 1, a 180-day CD on April 1 and, again, a series of three 30-day CD's beginning October 1. This would produce a monthly average interest cost of 4.25 percent. If a series of twelve 30-day maturity CD's had been issued instead, the average cost would have been about 4.75 percent. A series of four 90-day CD's would have produced an average cost of about 5.15 percent. If

either successive 180-day CD's or one 360-day CD had been issued, average cost would have been 5.65 percent.

The cost of lengthening maturity can be derived by modifying the cost-minimizing strategy. For example, if a 270-day maturity CD were issued April 1 (alternative strategy #1) instead of a 180-day CD (the cost-minimizing strategy), the average of maturity for the year would be increased from approximately 2.25 to 4 months. Surprisingly, this would increase the average interest cost by only about .01 percent. However, the intrayear pattern of interest costs would differ with each strategy. If two successive one-month CD's were followed by a ten-month CD issued on March 1 (alternative strategy #2), the maturity average would rise to 4.8 months and the average interest cost to 4.35 percent. Continuing this process, it would be possible to develop a table showing combinations of maturity and interest-rate averages associated with various maturity strategies. (See Table 2).

Table 1

Hypothetical Projection of Interest Rates Needed to Attract Various Maturity CD's for a Future Year*

	CD's maturing in			
	30-89 days	90-179 days	180-359 days	1 year and over
January 1	5.50	5.65	5.65	5.65
February 1	4.25	4.50	4.65	4.65
March 1	3.90	4.00	4.25	4.25
April 1	3.65	3.75	4.15	4.50
May 1	4.40	4.60	4.25	5.13
June 1	4.75	5.00	5.40	5.50
July 1	5.25	5.50	5.65	6.00
August 1	5.50	5.75	5.90	6.00
September 1	5.00	5.15	5.50	5.75
October 1	5.50	5.65	5.75	5.75
November 1	4.75	5.00	5.10	5.15
December 1	4.50	4.75	4.90	5.15

*This was approximately the course of CD rates in 1971.

Table 2

Maturity and Interest Cost Trade-offs for a Future Year

	Maturity Average	Monthly Average CD Rate
Cost-minimizing strategy	2.25	4.25
Alternative strategy #1	4.00	4.26
Alternative strategy #2	4.80	4.35
	etc.	etc.

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