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Trends and Cycles in the Money Supply: 1959-78

By David B. Foster

The behavior of the nation's money supply has received an increasing amount of attention in recent years. Most economists believe that monetary developments have important implications for the economy, and the Federal Reserve System has increasingly emphasized monetary growth in the implementation of monetary policy. As a result, information on the behavior of the money supply is continually analyzed by large segments of the public to discern its implications for economic developments and monetary policy trends.

A number of financial innovations occurring over the past several years appear to have altered the behavior and usefulness of the monetary aggregates as currently defined. In response to these developments, the Federal Reserve is considering alternative definitions of the monetary aggregates that are more consistent with current financial practices.

This article reviews and analyzes the behavior of the major money supply measures over the period 1959 through 1978. The analysis focuses on trends and cycles in the monetary aggregates and their components. In addition to the major money supply measures,

the article also discusses an alternative set of aggregates that has been proposed by the staff of the Federal Reserve Board to replace the traditional measures. The first section deals with trends in the major monetary aggregates, while the second section discusses the cyclical behavior of the money supply measures. The proposed aggregates are discussed in the third section.

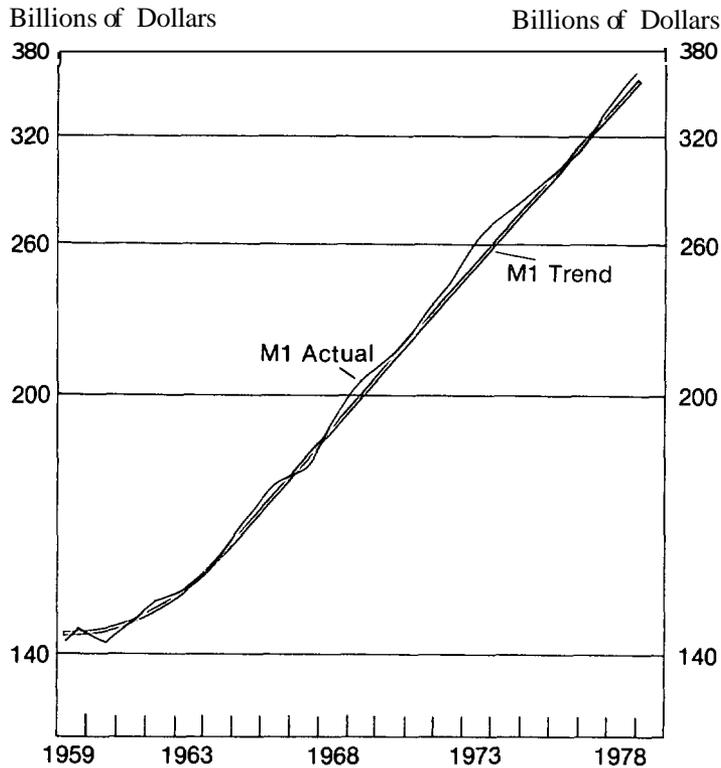
TRENDS IN THE MONEY SUPPLY

The secular movement, or trend, of an economic time series is the long-run underlying movement of the series. The trend ignores the shorter run cyclical, seasonal, and irregular variations in a series in order to focus on the behavior of the series over the long run. The steady upward trend of the money supply is shown in Chart 1, which contains the actual levels and the estimated trend levels of **M1**, the narrowly defined money supply.¹

¹ The actual values are seasonally adjusted quarterly average data. Estimated trend values are obtained by regressing the natural logarithms of the seasonally adjusted quarterly average levels of the aggregates and components on fourth order polynomials in time. The order of each polynomial is set at four to allow for changes in trend due to the four business cycles that occurred over the same period. The growth rates are calculated from the trends estimated in this way. Specifically, each growth rate is calculated as the difference in estimated natural logarithms of the trend level.

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Chart 1
ACTUAL AND TREND LEVELS OF M1



The calculated growth rates of the trend values of the three major monetary aggregates—M1, M2, and M3—are contained in Table 1.² As shown in the table, the growth rates of all three aggregates accelerated during the 1959-78 period. During the last half of the period, 1969 through 1978, the trend growth rate of M1 was 5.9 per cent, compared with 3.3

per cent between 1959 and 1968. Similar increases occurred in the trend growth rates of M2 and M3.

The acceleration in the growth rates of M1, M2, and M3 reflects an acceleration in the trend growth rates of the four major components of the monetary aggregates—currency, demand deposits, time and savings deposits at commercial banks other than large negotiable CD's, and time and savings deposits at nonbank thrift institutions. The trend growth rates of each of the four components, also shown in Table 1, were higher during the 1969-78 period than in the 1959-68 period.

The broader aggregates—M2 and M3—have grown more rapidly than M1 in the past 20

² The monetary aggregates to be discussed in this article are M1, M2, and M3. M1 consists of currency and demand deposits (checking account balances) held by the nonbank public. M2 is equal to M1 plus time and savings deposits of commercial banks other than large negotiable certificates of deposit at weekly reporting banks. M3 is equal to M2 plus deposits at nonbank thrift institutions.

Table 1
TREND GROWTH RATES IN SELECTED VARIABLES
(Averages of quarterly percentage changes)

<u>Variable</u>	<u>1959-68</u>	<u>1969-78</u>	<u>1959-78</u>
M1	3.3	5.9	4.6
M2	6.0	8.7	7.4
M3	7.2	9.7	8.4
Currency	4.1	8.2	6.2
Demand deposits	3.1	5.2	4.1
Time and savings deposits in M2	10.4	11.1	10.8
Time and savings deposits at nonbank thrift institutions	9.4	11.2	10.3
Real GNP*	4.1	2.9	3.5
GNP deflator†	2.3	6.3	4.3
Interest rate on commercial paper*	3.8	2.0	2.9
Interest rate on time and savings deposits §	6.7	1.8	4.2

*Real GNP is GNP adjusted to exclude the effect of changes in the price level.

†The GNP deflator is a measure of changes in the price level.

*The 4- to 6-month commercial paper rate is used as a measure of market interest rates.

§The commercial bank passbook savings rate is used as a proxy for the rate on time and savings deposits.

years. Throughout the **1959-78** period, the trend growth of **M2** (7.4 per cent) was higher than the trend growth of **M1** (4.6 per cent). This occurred because time and savings deposits at commercial banks, which are included in **M2** but not in **M1**, increased more rapidly than either demand deposits or currency. Similarly, **M3** grew more rapidly than **M2** over the past 20 years because the interest-bearing component comprises a larger percentage of **M3** than of **M2**.

The patterns observed during the **1959-78** period in the trend growth rates of the monetary aggregates may be analyzed by reference to either demand or supply forces. A supply analysis would focus mainly on factors controlled by monetary policy. A demand analysis, on the other hand, would examine factors affecting the public's demand for monetary assets. The analysis in this article is

demand-oriented, focusing on factors that influence the public's demand for the aggregates and their components.

A demand-oriented analysis indicates that movements during the **1959-78** period in the trend growth rates of the monetary aggregates and their components—currency, demand deposits, and time and savings deposits—were closely related to movements in real income, inflation, and interest rates. Traditional theories indicate that the demand for monetary assets is positively related to real income, the price level, and their own rates of return, and negatively related to the expected yield on alternative financial assets.³ Rising real income is generally

³ See, for example, William J. Baumol, "The Transactions Demand for Cash: An Inventory Theoretic Approach," *Quarterly Review of Economics*, Vol. 66, November 1952, pp. 545-56.

accompanied by increases in monetary assets, as the public attempts to keep a stable relationship between its monetary balances and its real income. Rising prices tend to be accompanied by increases in nominal monetary assets as the public seeks to maintain the purchasing power of its money balances. Rising market interest rates, on the other hand, generally result in declines in monetary assets, as the public shifts out of these assets and into alternative financial assets in order to maximize interest income. Increases in interest rates on time and savings deposits are associated with increases in some monetary assets—time and savings deposits—and with declines in other monetary assets—currency and demand deposits.⁴

The impact of changes in income, inflation, and interest rates on the demand for various types of monetary assets helps explain the secular behavior of the monetary aggregates and their components. For example, empirical analysis indicates that acceleration in the rate of inflation explains most of the acceleration in the growth of the aggregates and their components over the past 20 years. In other words, the more rapid growth in the money supply measures during the 1969-78 period compared with the 1959-68 period was associated with a higher inflation rate in the later period (Table 1). In addition, rising market interest rates depressed monetary growth between 1969 and 1978 less than in the period from 1959 to 1968, since interest rate increases were proportionately less in the more recent period. The factors contributing to more

⁴ The rates of return on most deposit components of the aggregates are subject to ceilings set by the regulatory authorities. The ceiling on demand deposits has been zero since the 1930s. However, the ceilings on time and savings deposits at commercial banks and at nonbank thrifts have increased, although generally not by as much as market interest rates.

rapid growth of the monetary aggregates have been offset to some extent by less rapid growth in real income over the past decade, which has tended to dampen growth in the demand for monetary assets.

Differences in the responsiveness of various monetary assets to changes in interest rates and real income help explain differences in trend growth rates among the monetary aggregates during the 1959-78 period.⁵ For example, the rapid growth of time and savings deposits and the broader monetary aggregates relative to the growth of M1 reflects in part the differential impact of interest rates on various monetary assets. The dampening impact of rising market interest rates on monetary growth was offset somewhat for M2 and M3 by the rise in rates on the time and savings deposit components of the broader aggregates. That rise in rates, however, reinforced the negative impact of higher market rates on the growth of M1, since the desirability of holding demand deposits and currency varies inversely with both market interest rates and rates on time and savings deposits.

The rise in real GNP also contributed to the relatively rapid growth of the more broadly

⁵ The discussion in the remainder of this section is based in part on the results of regression analysis indicating the following elasticities, which measure the responsiveness of the demand for assets with respect to their determinants.

Elasticity of the demand for	With respect to			
	Price Level	Real GNP	Commercial Paper Rate	Rate on Time and Savings Deposits
Currency	1.00	.58	-.03	-.08
Demand deposits	1.00	.55	-.07	-.14
Time and savings deposits in M2	1.00	1.75	-.21	.21
Time and savings deposits at nonbank thrift institutions	1.00	1.35	-.24	.42

The empirical methodology employed assumes unitary price elasticity of the demand for each monetary asset, which implies that the demand for assets changes proportionately with the price level. Thus, price behavior does not account for differential growth rates among aggregates. Changes in the rate of inflation can, however, help explain the variation in growth rates of a particular aggregate or component over time.

defined monetary aggregates. Empirical analysis indicates that while the demand for currency and demand deposits increases less than proportionately to changes in real income, the demand for time and savings deposits increases more than proportionately to changes in real income. Thus, the positive impact of increases in real GNP on monetary growth over the period from 1959 to 1978 was more pronounced for monetary aggregates that include time and savings deposits than for the narrowly defined money supply, which includes only demand deposits and currency.

THE CYCLICAL BEHAVIOR OF THE MONEY SUPPLY

Cyclical movements of an economic time series are recurring, although not necessarily periodic, variations related to fluctuations in general economic activity. To examine the cyclical behavior of a series, the trend movements in the series must be removed so that the shorter run variations can be identified. For example, while the trend level of **M1** increases **steadily**, **M1** falls below the trend at times and rises above the trend at other times. The cyclical component of **M1** consists of these fluctuations around the trend. The percentage deviations of the actual levels from the estimated trend levels are used to represent the cyclical behavior of each series. Cyclical movements in **M1**, **M2**, and **M3** are shown in Chart 2.⁶

The cyclical movements in each of the money supply measures tend to lead the general business cycle (Chart 2). Thus, the cyclical

peaks in **M1**, **M2**, and **M3** generally occur prior to the peak in business activity, and the trough in the monetary aggregates tends to occur before the trough in the business cycle. An exception to this pattern occurred in the vicinity of the trough of the **1973-75** recession, when **M1** continued to decline cyclically following the trough in the business cycle. This atypical pattern may reflect a shift in the normal behavior of **M1** in the mid-1970s.⁷ Due to this shift, **M1** grew less rapidly than it typically does following business cycle troughs.

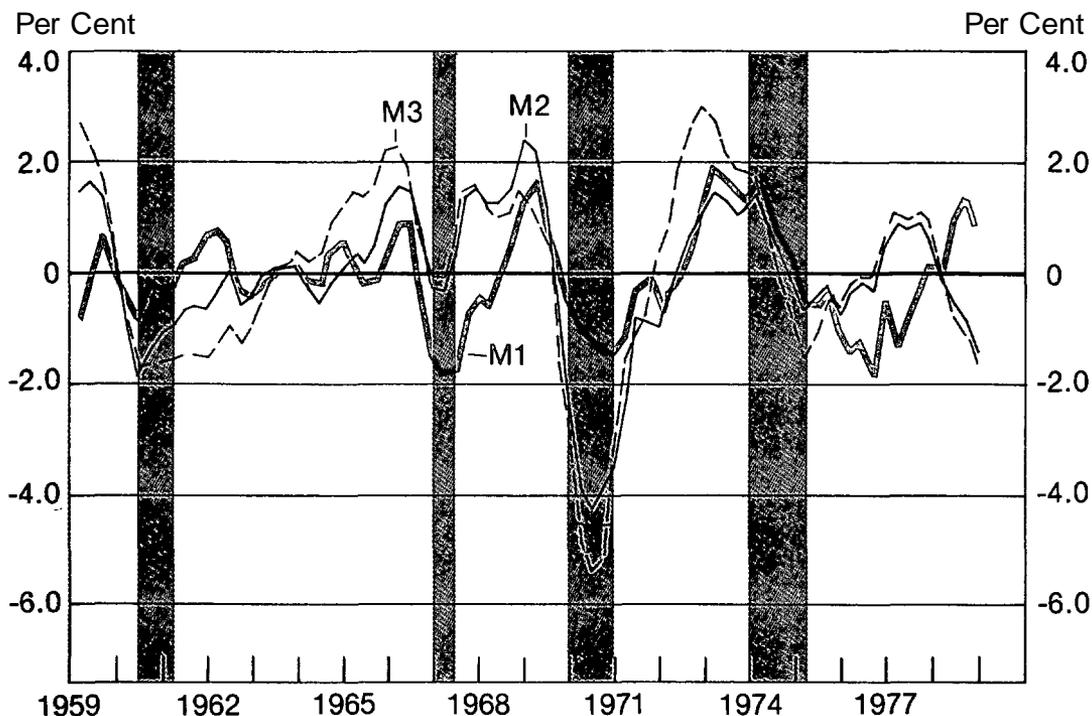
Although the cyclical behavior of the aggregates is similar in terms of timing, the various money supply measures differ noticeably in the degree of their cyclical variability. Table 2 presents the standard deviations, which are measures of the degree of variability, for the cyclical movements in the monetary aggregates and their components. These standard deviations show that cyclical movements in **M1** are less volatile than cyclical movements in **M2**, and cyclical movements in **M2**, in turn, are less volatile than cyclical movements in **M3**. The differences in volatility between **M1** and **M2** reflect the impact of time and savings deposits at commercial banks, which are in **M2** but not in **M1**. Cyclical movements in these deposits are much more volatile than those in **M1**. Similarly, the greater cyclical volatility of **M3** than of **M2** is due in part to the impact of time and savings deposits at nonbank thrift institutions, whose cyclical movements are more volatile than cyclical movements in either **M1** or time and savings deposits at commercial banks." In addition,

⁶ Specifically, the residuals obtained from each trend estimation procedure are assumed to constitute the cyclical movement of each series. Any irregular variations not averaged out by using seasonally adjusted quarterly average data, however, are subsumed in the cyclical portion of the series estimated in this way.

⁷ For a good empirical study of the apparent shift in the demand for money, see Stephen M. Goldfeld, "The Case of the Missing Money," *Brookings Papers on Economic Activity*, 1976:3, pp. 683-739.

⁸ Part of the explanation for the greater volatility of time and savings deposits at nonbank thrift institutions than of the time and savings deposit component of **M2** may be that the latter contains large negotiable **CD's** at banks other than weekly reporting banks. These large time deposits are

Chart 2
ESTIMATED CYCLICAL MOVEMENTS OF THE MONETARY AGGREGATES



NOTE: Shaded areas represent recessions as dated by the National Bureau of Economic Research, except for the shaded area in 1966-67, which corresponds to a "mini-recession." For purposes of this article the peak of the mini-recession is dated at the fourth quarter of 1966, and the trough is dated at the second quarter of 1967.

time and savings deposits, which tend to reflect the large cyclical movements occurring in market interest rates, comprise a larger percentage of **M3** than of **M2** and thereby contribute more to the volatility of **M3** than to that of **M2**.

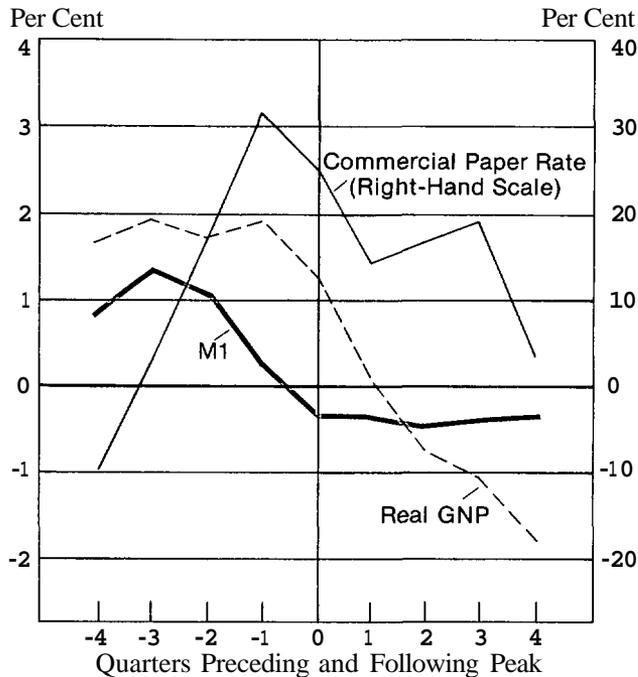
The cyclical behavior of the money supply measures and their components is closely related to cyclical movements in real **GNP** and interest rates. The relationship between real

managed liabilities that are used by banks to offset movements in other deposits. Thus, the inverse relationship between large **CD's** and other deposits at commercial banks may contribute to the lower variability of the total time and savings deposit component of **M2**.

GNP, interest rates, and **M1** in the vicinity of cyclical peaks is seen in Chart 3, which shows average cyclical movements in these variables in the vicinity of the peaks in general business cycles during the 1959-78 period. For example, on average, for the quarters in which cyclical peaks occur, the level of **M1** was below its trend by about 0.25 per cent.

As Chart 3 also shows, during the initial phases of a cyclical downturn in **M1**, there is a sharp cyclical increase in market interest rates. Interest rates undergo a sharp rise from the third quarter through the first quarter before the cyclical peak. During the same period, **M1** shows a cyclical decline, despite a generally

Chart 3
THE BEHAVIOR OF SELECTED VARIABLES IN THE VICINITY OF
BUSINESS CYCLE PEAKS



stable real GNP. Thus, the decline in **M1** reflects the rise in interest rates.⁹ However,

beginning in the peak quarter and extending through the four quarters after the peak, both real GNP and interest rates move generally downward. Also, **M1** continues its cyclical decline during most of this period. In this latter stage, therefore, the cyclical decline in **M1** reflects mainly the cyclical downturn in real GNP. The decline in interest rates offsets some of the impact of real GNP, reducing somewhat the extent of the decline in **M1**.

Table 2 :
STANDARD DEVIATIONS OF THE
ESTIMATED CYCLICAL MOVEMENTS
OF THE MONETARY AGGREGATES
AND THEIR COMPONENTS

Aggregate or Component	Standard Deviation
M1	0.93
M2	1.35
M3	1.81
Currency	0.86
Demand deposits	1.27
Time and savings deposits	2.60
Nonbank thrift deposits	2.85

The broader money supply measures—**M2** and **M3**—as well as the time and savings deposit components of these measures follow the same pattern as **M1** in the vicinity of cyclical

⁹ For purposes of exposition, the discussion of cyclical movements in the monetary measures attributes these movements to the current effects of interest rates and real GNP. However, other factors, including the lagged effects of income and interest rates, may also be important.

peaks. That is, M2 and M3 decline sharply in the initial phase, with the decline being less pronounced after the cyclical peak has been reached. Moreover, the relationship between cyclical movements in the broader aggregates and real GNP and interest rates is similar to the relationship between M1 and the other variables — that is, the initial downward movement reflects a sharp rise in interest rates, while the downward movement in the latter stages reflects the impact of the decline in real GNP.

The relationship between real GNP, interest rates, and M1 in the vicinity of cyclical troughs in the general business cycle is shown in Chart 4. The chart shows that as M1 declines during the initial stages of recessions there is an associated cyclical decline in real GNP. That is,

in the third and second quarters prior to the business cycle trough, both M1 and real GNP show cyclical declines. Interest rates are relatively stable during this period, so that the decline in M1 reflects the decline in real GNP. The decline in M1 slows in the quarter preceding and the quarter of the cyclical trough in response to the sharp drop in interest rates during this period. In the quarter following the trough, real GNP increases and interest rates register further declines. Thus, the upward movement in M1 during this quarter reflects the positive influence of both variables. Subsequently, real GNP continues to rise and interest rates move in a mixed pattern, with the upward movement in M1 primarily reflecting the rebound in the economy.

Chart 4
THE BEHAVIOR OF SELECTED VARIABLES
IN THE VICINITY OF BUSINESS CYCLE TROUGHS

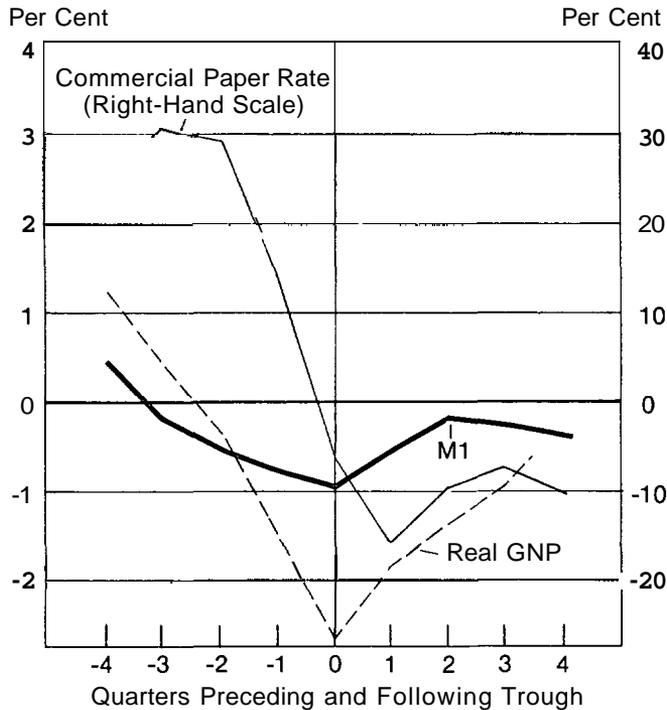


Table 3
THE PROPOSED MONETARY AGGREGATES

<u>Proposed Aggregate</u>	<u>Component.</u>
M1	Current M1 Plus: Negotiable order of withdrawal balances Credit union share drafts Demand deposits at thrift institutions Savings accounts subject to automatic transfer Less: Demand deposits of foreign commercial banks and official institutions
M2	Proposed M1 Plus: Savings deposits at all depository institutions not otherwise included in proposed M1
M3	Proposed M2 Plus: All time deposits at all depository institutions

THE PROPOSED MONETARY AGGREGATES

As a result of recent financial innovations and regulatory changes altering the character of the public's monetary assets, the staff of the Federal Reserve Board has proposed revisions in the existing definitions of the monetary aggregates. These changes recognize the possibility that past relationships may not be a good guide to future behavior. In constructing the proposed aggregates, the emphasis is placed on combining deposits with similar liquidity characteristics rather than on the type of depository institution at which they are held. For example, the proposed definition of **M2** includes all savings deposits, regardless of whether they are held at banks or at thrifts.

Table 3 presents the set of revised definitions proposed by the staff of the Board of Governors. Proposed **M1** differs from current **M1** in that it includes transactions-related balances at all financial institutions, while it excludes demand deposits of foreign commercial banks and official institutions.

Proposed **M2** equals proposed **M1** plus savings deposits at all depository institutions not otherwise included in proposed **M1**. Unlike current **M2**, proposed **M2** omits time deposits at commercial banks and includes savings deposits at nonbank thrift institutions. Proposed **M3** adds time deposits at all depository institutions to proposed **M2**. Unlike current **M3**, proposed **M3** includes large negotiable **CD's** at weekly reporting banks.¹⁰

As seen in Table 4, the relative trend growth rates of proposed **M1**, **M2**, and **M3** followed the same general pattern as their current counterparts during the 1959-78 period. That is, for the period as a whole, proposed **M3** grew more rapidly than proposed **M2**, and proposed **M2** grew more rapidly than proposed **M1**. Also, for each of the proposed aggregates, their trend

¹⁰ For a discussion of these recent financial innovations and regulatory changes as well as an explanation of the proposed monetary aggregates, see "Redefining the Monetary Aggregates," *Federal Reserve Bulletin*, Board of Governors of the Federal Reserve System, January 1979, pp. 13-42.

Table 4
TREND GROWTH RATES OF CURRENT AND PROPOSED
MONEY STOCK MEASURES
(Averages of quarterly percentage changes)

	<u>1959-68</u>	<u>1969-78</u>	<u>1959-78</u>
Current M1	3.3	5.9	4.6
Proposed M1	3.3	5.9	4.6
Current M2	6.0	8.7	7.4
Proposed M2	5.6	6.7	6.2
Current M3	7.2	9.7	8.4
Proposed M3	7.6	9.8	8.7
Domestic demand deposits and other transactions balances	3.1	5.2	4.1
Savings deposits at all depository institutions	7.5	7.3	7.4
Time deposits at all depository institutions	23.9	16.7	20.3

growth rates accelerated during the period, with growth rates in the 1969-78 period exceeding those in the 1959-68 period.

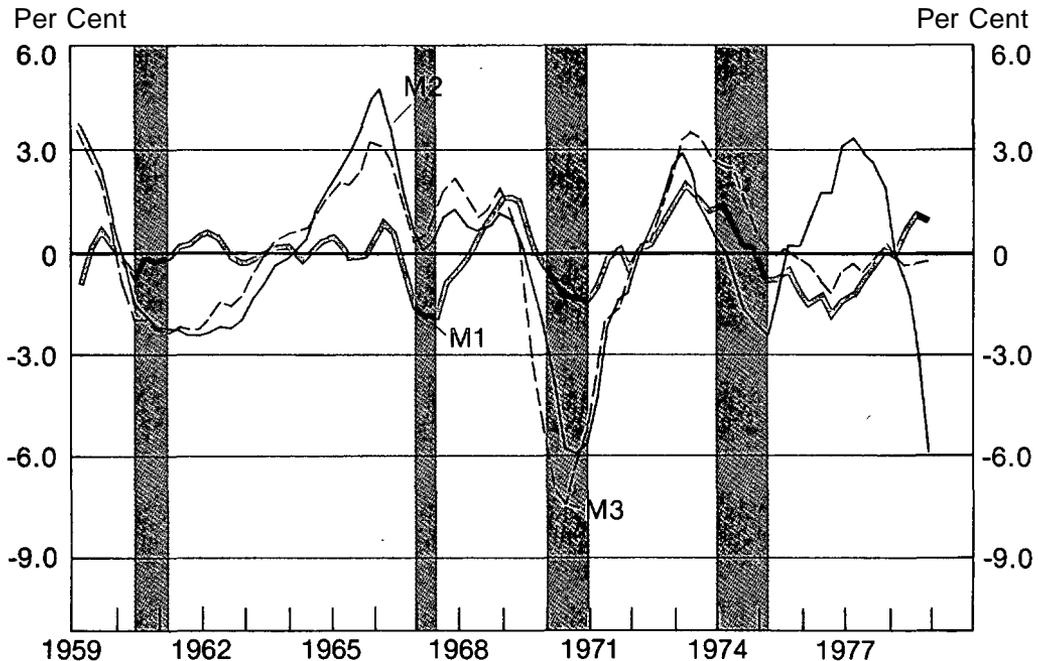
Between 1959 and 1978, there was no difference between the trend growth rates of current and proposed M1, but the trend growth rates of proposed M2 and M3 were somewhat different than those of current M2 and M3 (Table 4). The similarity in trend growth rates between proposed and current M1 reflects the fact that, during the 1959-78 period, the composition of proposed M1 differed little from that of current M1. Over the same period, proposed M2 grew less rapidly than current M2. The slower growth of proposed M2 reflects the slower growth of savings deposits at nonbank thrifts than of time deposits at commercial banks. Savings deposits at nonbank thrift institutions grew more slowly, in part because the ceiling rates on these deposits increased during the period less than ceiling rates on time deposits. Proposed M3 grew more rapidly than current

M3 during the 1959-78 period, due to the rapid growth of large certificates of deposit, which are included in proposed M3 but not in current M3. The greater growth of CD's reflects the absence of ceiling rates on these large certificates.

The cyclical behavior of proposed M1, M2, and M3 is generally similar to the behavior of their current counterparts. As shown in Chart 5, all the measures decline in the vicinity of recessions and generally lead the turning points of the general business cycle. However, proposed M2 exhibits significantly more cyclical volatility than current M2 (Table 5).¹¹ Proposed M2 also exhibits slightly more cyclical

¹¹ Predictability as well as variability may be important in assessing the usefulness of alternative monetary aggregates for monetary policy purposes. No attempt was made in this study to determine the degree to which the variability of the various aggregates and their components could be predicted.

Chart 5
ESTIMATED CYCLICAL MOVEMENTS OF THE PROPOSED MONETARY AGGREGATES



NOTE: Shaded areas represent recessions as dated by the National Bureau of Economic Research, except for the shaded area in 1966-67, which corresponds to a "mini-recession." For purposes of this article the peak of the mini-recession is dated at the fourth quarter of 1966, and the trough is dated at the second quarter of 1967.

volatility than proposed M3, in contrast to the relationship between current M2 and M3.¹² This is because the savings deposit component of proposed M2 is more cyclically volatile than the time and savings deposit component of either current M2 or proposed M3. Because the ceiling rates on savings deposits remain relatively stable over the course of the business cycle, the wide fluctuations occurring in market interest rates cause savings deposits at banks

¹² This occurs in spite of the fact that time deposits at all depository institutions are the most volatile of the various components. The reason is that the cyclical movements of time deposits and of savings deposits tend to behave inversely: Whenever one increases, the other tends to decrease. Thus, their sum is less volatile than either taken separately.

and thrifts—all of which are included in proposed M2—to exhibit considerably more cyclical volatility than other monetary assets.

CONCLUSION

The secular and cyclical behavior of the current and proposed monetary aggregates and their components have been examined in this article by analyzing the factors influencing the demand for various monetary assets. The analysis shows that the trend growth rates of the aggregates and their components, have increased in the past several years despite an upward trend in market interest rates and declining growth in real income. More rapid inflation accounts for most of the increased growth in the demand for monetary assets, as

households and businesses have attempted to maintain the real purchasing power of their money balances. The broader aggregates, which contain a large interest-bearing component, have increased more rapidly than the more narrowly defined aggregates, both because rates on time and savings deposits have moved upward with market interest rates and because the broader aggregates are more responsive to changes in real income.

Cyclical movements in each of the current and proposed money stock measures tend to lead the business cycle. The cyclical movements of the broader aggregates are generally more volatile than cyclical movements in the narrower measures, however, because the time

and savings deposit component of the broader aggregates are relatively more responsive to cyclical fluctuations in income and interest rates. For example, M2 and M3 typically decline more than **M1** in the vicinity of a recession—initially because of high market interest rates and later because of declining real income.

Over the 1959-78 period, the secular and cyclical behavior of proposed **M1** differed little from that of current **M1**. Greater differences have emerged recently as a result of rapid growth in ATS, NOW accounts, and share drafts. For example, in the first quarter of 1979, proposed **M1** increased at an annual rate of 2.0 per cent, while current **M1** declined at an annual rate of 2.1 per cent. On April 20, 1979, a Federal Appeals Court ruled that current law does not authorize ATS, NOW accounts, and credit union share drafts. Therefore, the extent to which current and proposed **M1** differ in the future will depend largely on action by Congress delineating the types of accounts that can be offered by banks and thrifts.

Proposed M2 and M3 exhibit significantly different behavior than current M2 and M3. Due to its greater responsiveness to movements in market interest rates, proposed M2 exhibits greater cyclical variability than current M2. Therefore, proposed M2 shows greater weakness during periods of high interest rates than current M2. Proposed M3, on the other hand, reveals greater strength than its current counterpart during periods of high interest rates because it includes large negotiable **CD's** at weekly reporting banks, which are not subject to regulatory interest rate ceilings. It is important to recognize these differences in evaluating the usefulness of the proposed aggregates for monetary policy purposes.

Table 5
STANDARD DEVIATIONS OF THE ESTIMATED CYCLICAL MOVEMENTS OF THE CURRENT AND PROPOSED MONEY STOCK MEASURES

<u>Aggregate or Component</u>	<u>Standard Deviation</u>
Current M1	0.93
Proposed M1	0.93
Current M2	1.35
Proposed M2	2.46
Current M3	1.81
Proposed M3	2.38
Domestic demand deposits and other transactions balances	1.32
Savings deposits at all depository institutions	4.18
Time deposits at all depository institutions	5.53

Bank Examination Classifications and Loan Risk

By Kenneth Spong and Thomas Hoenig

The commercial bank examination process strives to protect depositors and ensure that a bank properly serves its community. A major part of the examination process is the evaluation of a bank's loan portfolio in order to identify any loans that show undue risk and may be uncollectible. Such loans, which are referred to as classified loans, may be useful in evaluating the risk exposure of bank loan portfolios. Banks having a relatively low volume of classified loans, for example, might be low-risk banks. This would be true, however, only if a reliable relationship exists between loans classified by examiners and actual loan losses. While such a relationship might exist, few formal studies have been made to determine the usefulness of examination data in evaluating the risk exposure of bank loan portfolios.¹

This article analyzes information compiled from examination reports of a sample of state member banks in the Tenth Federal Reserve District. The purpose of the analysis is to explore, for the sample banks, various aspects

of the relationship between loans classified by examiners and actual loan losses and to determine whether data from the sample banks provide any evidence that examination information may be used to indicate the riskiness of loan portfolios.

THE EXAMINATION PROCESS

The primary objective of the loan examination is to evaluate the overall condition of a

¹ Other studies using bank loan classification data include George Benston, "Substandard Loans," *National Banking Review*, Vol. 4, March 1967, pp. 271-81; George Benston and John T. Marlin, "Bank Examiners' Evaluation of Credit: An Analysis of the Usefulness of Substandard Loan Data," *Journal of Money, Credit, and Banking*, Vol. 6, February 1974, pp. 23-44; David R. Graham and David Burras Humphrey, "Bank Examination Data as Predictors of Bank Net Loan Losses," *Journal of Money, Credit, and Banking*, Vol. 10, November 1978, pp. 491-504; Joseph F. Sinkey, Jr., "Identifying 'Problem' Banks," *Journal of Money, Credit, and Banking*, Vol. 10, May 1978, pp. 184-93; Albert M. Wojnilower, *The Quality of Bank Loans: A Study of Bank Examination Records*, Occasional Paper 82, National Bureau of Economic Research, 1962; and Hsiu-Kwang Wu, "Bank Examiner Criticisms, Bank Loan Defaults, and Bank Loan Quality," *Journal of Finance*, Vol. 24, September 1969, pp. 697-705. Also, see Thomas Hoenig and Kenneth Spong, "Examiner Loan Classifications and Their Relationship to Bank Loan Chargeoffs and Economic Conditions," September 1977, which is available from the authors upon request.

Kenneth Spong is an economist and Thomas Hoenig is an assistant vice president, both in the Division of Bank Supervision and Structure at the Federal Reserve Bank of Kansas City.

bank's loan portfolio. Since the majority of a typical bank's assets are loans, this review is one of the more important segments of a bank examination. In a loan review, examiners first determine a dollar cutoff level for a bank and then proceed to examine only those lines of credit above this level. Loans below the cutoff level are usually not reviewed because of their large number and their relatively small contribution to the total dollar amount of the bank's loan portfolio.²

The examiners next begin to collect information that they will need to judge the soundness of those loans selected for review. First, examiners record on "line cards" the relevant details of each particular loan, such as borrower's name, business, original and present loan balance, repayment terms and interest rate, collateral, payment history, and other supporting documentation. With this information, the examiner also ties major credit lines together by borrower, since the examiner is concerned with evaluating all of a borrower's loans. The bank's credit files are then employed to analyze the credits and to complete the loan documentation. These credit files will normally contain financial and operating statements and cash flow projections, as well as other important financial information. Also, the credit lines are discussed with the bank's management to check on any missing information and recent developments as well as to gain insights into management loan policies.

Once the examiner collects the needed information, he begins to formally evaluate each loan. Loans which demonstrate weakness or

undue risk are then criticized or classified by the examiners. According to the standardized loan classification procedures drafted by the three Federal supervisory agencies in 1949, the three main loan classification categories are:

- 1) Substandard—for those lines of credit "involving more than a normal risk due to the financial condition or unfavorable record of the obligator, insufficiency of security, or other factors noted in the examiner's comments."
- 2) Doubtful--credits "the ultimate collection of which is doubtful and in which a substantial loss is probable but not yet definitely ascertainable in amount."
- 3) Loss-credits which are regarded as uncollectible and as estimated losses which should be written off against the bank's capital.

In choosing whether to classify a loan into one of these categories, the examiner will rely on the loan documentation, collateral, and his analysis of the financial statement. The examiner will also look at the repayment history of the loan and the present and future prospects of the borrower. For example, an examiner would generally classify a loan if past payments have not been made, the collateral is **insufficient**, or the borrower is demonstrating a poor earnings record. Also, a loan might be criticized if the bank's credit files did not contain sufficient current information on the borrower and if the bank's management was not closely supervising the loan. But more importantly, the examiner must use a great deal of judgement and discretion in evaluating loans, especially since he has no direct contact with the borrower. The basis for such

² For most of the banks in the sample, this cutoff level was set at approximately 1 per cent of a bank's gross capital. This ensured that the most important loans in a bank's portfolio were examined and that approximately 70 per cent of the dollar volume of each bank's loans were reviewed.

judgement rests on the examiner's training and experience and on certain credit guidelines similar to those used by bankers in granting loans.

The actual choice of which classification category is appropriate for a weak loan will further depend on the examiner's view of its ultimate collectibility. For example, "doubtful" and "loss" classifications are judged as probable losses and uncollectible loans, respectively. Thus, these loans should be much more likely chargeoff candidates than "substandard" loans, which represent the *ex ante* judgements of examiners, since any weaknesses these loans show are not yet sufficient to immediately threaten their collectibility. The examiner may also choose to classify only a portion of any loan or to separate a loan and classify portions of it in different categories. This might be likely if only part of a loan was adequately collateralized or if the borrower's income was sufficient to retire only part of the debt.

After this examination, all classified loans judged by the examiners as uncollectible should be charged off against the bank's capital account. In addition, the bank's management is then expected to review the remaining classified loans and determine if there is any way to improve the quality of these loans.

The subsequent performance of many classified loans may be followed in later examination reports. For example, if a classified loan has shown no improvement, it would usually be criticized again in the next examination. Moreover, if such a loan has shown any deterioration, it could be listed in a more severe category. Thus, a classified loan might be criticized in several examinations until either it had to be charged off or its condition improved enough to warrant an unclassified status. Finally, some of these loans might be partly charged off at one time, with the remainder being continued as an active loan on the bank's books.

THE LOAN CLASSIFICATION-LOSS RELATIONSHIP

This section analyzes data from examination reports from a sample of 13 Tenth District banks over a 14-year span from 1%2 through 1975. The purpose of the analysis is to investigate several aspects of the **classification-loss** relationship. First, the analysis determines the portion of all loan losses that were previously classified by bank examiners. The second aspect examined is the loss experience of classified loans and the extent to which examiners were successful in identifying the relative riskiness of such loans. Finally, this section compares the loss experience of classified loans with that of unclassified loans.

The examination data are analyzed using the following theoretical framework. First, total loan losses from a bank's portfolio are divided into two categories: losses from loans classified by the examiners and losses from loans not classified. This can be written as follows:

$$B = C_B + U_B$$

where

$$\begin{aligned} B &= \text{total loan losses (in dollar terms),} \\ C_B &= \text{losses from classified loans, and} \\ U_B &= \text{losses from unclassified loans.} \end{aligned}$$

(Note: U_B includes losses from both loans above the cutoff level which the examiners did not classify and loans below the cutoff level which were not reviewed by the examiner.)

Next, these losses can be expressed in percentage terms and related to all classified and unclassified loans as follows:

$$B = [(C_B/C)C] + [(U_B/U)U]$$

where

$$\begin{aligned} C &= \text{total amount of classified loans, and} \\ U &= \text{total amount of unclassified loans.} \end{aligned}$$

Finally, in the above equations, losses from classified loans, C_B , can be divided into the three classification categories:

$$C_B = [(S_B/S)S] + [(D_B/D)D] + [(L_B/L)L]$$

where

S = substandard classifications,

D = doubtful classifications,

L = loss classifications, and

Subscript B represents losses from each respective category.

With this framework, examination data from the 13 state member banks were analyzed, including all classified loans.³ The data yielded over 1,000 loan classifications at these banks. Also, a record was made of all chargeoffs (that is, losses) and recoveries from these classified loans as well as all other significant chargeoffs included in the reserve for bad debts adjustment page of the state and Federal Reserve examination reports. Information from examiner loan chargeoff cards and line cards was used to supplement the above information and to ensure that a complete data set was assembled. Although the dates of classifications and losses were also recorded, the following analysis focuses primarily on the size and number of classifications and losses, and not on their timing. For the sample banks, the vast majority of loan losses occurred within three or

³ The 13 banks were selected from the list of all Tenth District state member banks. Stratified sampling was utilized to select a small and a large bank group on the basis of total bank assets as of June 30, 1969. Five banks, each having total assets of \$25 million or more as of that date were in the large bank group, while eight banks were in the small bank group. These 13 banks ranged in size from approximately \$3 million to \$250 million in total assets. The sample was restricted to 13 banks because of practical resource restrictions and the desire to follow a group of banks and all of their classified loans over a period encompassing a variety of economic conditions.

four years after the initial date of classification.

Loan Losses and Their Previous Classification

Losses can arise from either classified or unclassified loans. If losses previously classified, C_B , constitute a large portion of a bank's total losses, B , bank examinations have been successful in detecting and classifying most risky loans. If this C_B/B fraction is small, however, the examination has failed to identify most loan problems.

To determine the C_B/B ratio for the sample banks, all chargeoffs from loans above the examiner cutoff level were traced back to see whether they had previously been classified.⁴ These large loan losses and their previous classification records were examined in terms of both the number of chargeoffs and their dollar amounts. The loan loss information was then used to divide all of the sample banks' chargeoffs into three separate categories: small loan chargeoffs, large loan chargeoffs not previously classified, and large loan chargeoffs previously classified. The chargeoffs from classified loans were further divided into substandard, doubtful, and loss categories for the last examination prior to chargeoff.⁵ Since the results

⁴ Both complete and partial loan chargeoffs are included in this section. A few of the partial chargeoffs were less in dollar terms than the examiner cutoff level; these partial chargeoffs were included if they could be shown to come from loans above the cutoff level. In the case of large loans not previously classified, this information was generally available from the examiner's line and chargeoff cards or from the examination reports.

⁵ A number of the loans charged off were previously listed under more than one classification category during a particular examination. If this occurred, each chargeoff was assumed to originate with and continue through the severest classification categories listed. Also, if a loan chargeoff arose from more than one classification category, this chargeoff was apportioned among the respective categories.

Table 1
LOAN CHARGEOFFS AND THEIR SOURCES: 1962-75
(In thousands of dollars)

	All Banks (12)		Large Banks (4)		Small Banks (8)	
	Dollar Amount	Per Cent	Dollar Amount	Per Cent	Dollar Amount	Per Cent
Total chargeoffs (B)	6,420	100.0	4,253	100.0	2,167	100.0
Previously classified (C _B)*	3,932	61.2	2,586	60.8	1,346	62.1
Substandard	1,355	21.1	887	20.9	468	21.6
Doubtful	866	13.5	729	17.1	137	6.3
Loss	1,712	26.7	970	22.8	742	34.2
Previously unclassified (U _B)	2,489	38.8	1,667	39.2	822	37.9
Examined (large loans)	569	8.9	348	8.2	221	10.2
Not examined (below cutoff level)	1,920	29.9	1,319	31.0	601	27.7

*Last examination prior to chargeoff.

from the number of chargeoffs and the dollar amount of chargeoffs are generally comparable, only dollar terms are discussed here.

Of total loan chargeoffs for the sample banks, over 61 per cent (*i. e.*, the **C_B/B ratio**) were from large loans which the examiners had previously classified (Table 1).⁶ Of the remainder, nearly 30 per cent came from small loans below the cutoff level and fewer than 9 per cent

were from large loans which the examiners did not classify. In addition, of total loan chargeoffs, 21 per cent had been classified as substandard, and 13 and 27 per cent had been classified as doubtful and loss, respectively, in the most recent examination prior to their chargeoffs. Of the loss **classification** chargeoffs, over one-half had been originally detected at the substandard or doubtful level. Indeed, nearly 40 per cent of all chargeoffs were first classified as substandard, and over 8 per cent of total chargeoffs were **originally** classified as doubtful.⁷

Bank examiners thus appear to catch a large portion of the problem loans in the pool of

⁶ One of the larger banks had to be dropped from this section because of a change in reporting procedures, so the results reported are for the remaining 12 banks. A number of the smaller loans charged off had been previously reviewed and classified by the examiners because of their past **due** status or because they were the remainder of larger classifications. However, such loans were not reported separately in Table 1 because no specific chargeoff information was available on many of these classifications below the cutoff level. Also, these loans were generally not of sufficient number or size to warrant further consideration.

⁷ These results were based on our review of loans by number of chargeoffs and by initial classification category for classified loans.

loans that they examine. In fact, of the \$4.5 million (\$3,932 million + \$0.569 million) of large loan chargeoffs in Table 1, less than \$0.6 million (\$0.569 million), or approximately one-eighth, was not previously classified by the examiners. Since loan classifications represented, on average, only 1 to 3 per cent of total loans at the sample banks, the bank examiners have used a relatively small pool of loans to identify these problem loans.

Loss Experience of Classified Loans

If the examiners are successful in grouping classified loans into separate categories, those classified as loss should have the highest chargeoff rates, followed by doubtful loans, and substandard classifications should have the lowest loss record.

In terms of the loan-loss model, the following relationship would be expected:

$$\{S_B/S\} < \{D_B/D\} < \{L_B/L\}.$$

For the sample banks, this classification-loss relationship was estimated by tracing each loan classification through from its initial listing in an examination report to its final settlement as loss, paid-in-full, or removed from classification.⁸

Since an individual loan may be classified for a number of consecutive examinations, a procedure must be established for tracing loans classified more than once. Such a loan can be counted as a classification either once, that is,

at the time it is first noted, or each time it is encountered in an examination report as a classified loan. The first method is more appropriate for studying the loss possibilities of an examiner's first perception of a weak loan. The second alternative, however, also has important implications. For example, if one's concern is the loss implications of classified loans from a particular examination report, or if one's concern is the loss relationship of loans repeatedly classified, then this second approach is more useful.⁹ Because of this difference, therefore, both approaches are followed in the study.

When classified loans were traced according to their original criticism, the three classification categories of substandard, doubtful, and loss generally conformed to the expected relative risk pattern. Substandard loans had the lowest chargeoff rate, and loss classifications were the most likely chargeoff candidates. These results are presented in Table 2.

Of the 631 classifications in Table 2, a total of 538, or 85 per cent, were first classified as substandard, with the remainder roughly split between doubtful and loss classifications. Of the loans classified as substandard, about 19 per cent were charged off, fewer than 9 per cent were still classified, and 72 per cent were paid in full or were still outstanding without classification. For loans classified as doubtful,

⁸ Before proceeding, we would caution that we are not testing here for examiner efficiency or accuracy. Examiners, in carrying out their responsibilities, are not directly trying to predict a bank's losses, but rather trying to promote bank soundness by identifying possible loan problems before they have deteriorated to the point of default. Thus, an examiner would be judged successful if he alerted a bank's management to potential loan difficulties in time to reduce the risk of default.

⁹ The classified loans that were traced in this section include all substandard, doubtful, and loss classifications above the cutoff level at the 13 sample banks. If a loan was classified under more than one category, the separate amounts classified were listed under each of the respective categories. Any chargeoffs and recoveries from classified loans were recorded according to whether they were complete or partial. Also, if a loan classified under more than one category was only partly charged off, the chargeoff was assumed to originate from the most severe loan classification categories. In addition, any loan still classified in the 1976 and 1977 examinations without any chargeoffs was listed under the separate category of "loans still classified."

54 per cent were charged off. Of the loss classifications, 93 per cent were charged off.

Table 2 also indicates that if complete and partial chargeoffs are compared for each classification category, the loss category has the highest percentage of complete chargeoffs,

while substandard classifications have the lowest percentage. Thus, loss classifications, in addition to being the most likely chargeoff candidates, are also the most likely to be charged off in their entirety.

When the second approach for tracing loans

Table 2
11088 EXPERIENCE OF CLASSIFIED LOANS: 1962-75

	Total		Substandard		Doubtful		Loss	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
All Banks (13)								
Classified	631	100.0	538	100.0	50	100.0	43	100.0
Charged off:	170	26.9	103	19.1	27	54.0	40	93.0
Complete	88	13.9	39	7.2	13	26.0	36	83.7
Partial	82	13.0	64	11.9	14	28.0	4	9.3
Not charged off:	461	73.1	435	80.9	23	46.0	3	7.0
Paid-in-full or no longer classified	415	65.8	389	72.3	23	46.0	3	7.0
Still classified	46	7.3	46	8.6	0	0	0	0
Large Banks (5)								
Classified	269	100.0	234	100.0	17	100.0	18	100.0
Charged off:	66	24.5	37	15.8	12	70.6	17	94.4
Complete	33	12.3	10	4.3	7	41.2	16	88.9
Partial	33	12.3	27	11.5	5	29.4	1	5.6
Small Banks (8)								
Classified	362	100.0	304	100.0	33	100.0	25	100.0
Charged off:	104	28.7	66	21.7	15	45.5	23	92.0
Complete	55	15.2	29	9.5	6	18.2	20	80.0
Partial	49	13.5	37	12.2	9	27.3	3	12.0

was used, recording loans each time they were classified, the chargeoff percentages for classified loans in the three categories were slightly higher than under the **first** approach. Thus, the higher chargeoff percentages under this second method imply that loans classified more than once have higher default **rates**.¹⁰ Since these percentages are otherwise comparable with the previous results, no separate presentation is given. In summary, therefore, these results indicate that about 20 per cent of substandard loans, 50 per cent of doubtful, and 95 per cent of loss classifications will eventually be charged off.

Loss Comparisons of Classified and Unclassified Loans

If the examination process has been able to separate sound loans from unsound ones, losses from unclassified loans should be less likely than losses from classified ones. That is, U_B/U should be less than C_B/C . In fact, given the definitions for each classified loan category, the following relationship should occur:

$$U_B/U < S_B/S < D_B/D < L_B/L.$$

To test this relationship, chargeoffs from unclassified loans were first compared with all unclassified loans." Also, chargeoffs from loans in the three classification categories were compared with total classifications in each category. Since information was available only on the dollar amount of unclassified loans and their chargeoffs, and not on the number of

such loans, both unclassified and classified loans were traced by their dollar amounts. This is in contrast to the previous analysis in which the chargeoff percentages are based on the number of loans rather than their dollar size. The dollar chargeoff figures, however, give a more direct indication of the actual risk exposure in a bank's loan portfolio and also reflect the fact that many loan losses, both unclassified and classified, are only partial chargeoffs.

According to Table 3, the chargeoff rate on unclassified loans, U_B/U , was approximately 0.14 per cent. The small bank group had a higher rate of 0.19 per cent, while the rate of the large bank group was 0.12 per cent.

For classified loans, on the other hand, the dollar chargeoff rates were just under 10 per cent on substandard loans, nearly 60 per cent on doubtful loans, and about 95 per cent on loss classifications. When compared with the previous section, these figures demonstrate that many substandard classifications were only partly charged off, while doubtful and loss classifications were more likely to be charged off in their entirety. The percentages also imply that the average substandard loan was about 70 times more likely to be charged off than an unclassified loan at the sample banks. In addition, doubtful and loss classifications, respectively,

¹⁰ As a verification of this, substandard loans were separated into two groups: those classified one year only and those classified two years or more. These loans were then traced to check for eventual chargeoffs. Of the loans classified one year only, approximately 14 per cent were charged off. For loans classified substandard for two years or more, the chargeoff rate was just over 30 per cent.

¹¹ Total unclassified loans between 1962 and 1975 were computed by subtracting each bank's total classifications above the cutoff level from total loans. Likewise, total chargeoffs from unclassified loans were computed as the difference between total chargeoffs and chargeoffs from classified loans above the cutoff level. Thus, no individual unclassified loan was separately traced, and the above chargeoff total for unclassified loans was simply compared with total unclassified loans over the same period. The reported chargeoff percentages should therefore be viewed as approximations which are probably of reasonable accuracy given the large volume of loans included. In addition, one of the larger banks was dropped in this section because of unavailable loan information.

were 6 and 10 times more likely to be charged off than the average substandard loan.

EVALUATION OF LOAN RISK

If information from the examination process is to be used in evaluating the riskiness or future loss exposure of bank loan portfolios, a reliable estimate must be available of the relationship between examiner classifications and loan losses. As shown earlier, the relationship between losses and classifications may be stated as follows:

$$B = (S_B/S)S + (D_B/D)D + (L_B/L)L + (U_B/U)U.$$

Thus, if accurate estimates can be made of the percentage of substandard, doubtful, loss, and unclassified loans that will eventually be charged off, then future loss exposure can be closely projected. On the other hand, if these percentages vary significantly in a manner that cannot be foreseen, then the loan loss estimates may give a misleading signal of loss exposure. Therefore, this section evaluates the "stability" of the classification-loss relationship and discusses factors that might affect its stability.

The chargeoff percentages of both classified and unclassified loans did vary among individual banks and from year to year. The variations among individual banks were examined with the aid of the individual bank data. Each bank's chargeoff percentages by classification category were collected, and for each category an unweighted average, a standard deviation, and a coefficient of variation was calculated for the sample bank group. The standard deviation indicates the dispersion of individual bank chargeoff percentages around the mean, while the coefficient of variation relates this dispersion to the mean. These results are reported in Table 4.

Deviations occurred largely among the small banks. For example, three of the four coefficients of variation for the small bank group were over 50 per cent, while the large

Table 3
UNCLASSIFIED AND CLASSIFIED
LOANS AND CHARGEOFFS: 1962-75

	Total Loans (\$millions)	Amount Charged Off (\$ millions)	Per Cent
All Banks			
Unclassified*	1,827.2	2.5	0.14
Classified: †			
substandard	30.3	2.9	9.61
Doubtful	2.0	1.1	58.11
Loss	1.9	1.8	94.75
Large Banks			
Unclassified*	1,401.6	1.7	0.12
Classified: †			
Substandard	19.2	1.6	8.28
Doubtful	1.3	0.8	65.98
Loss	1.0	0.9	97.78
Small Banks			
Unclassified*	425.6	0.8	0.19
Classified: †			
Substandard	11.1	1.3	11.90
Doubtful	0.7	0.3	44.00
Loss	0.9	0.8	91.47

*These are all loans during the years 1962-75 that were not classified at the sample banks. The amount charged off is the difference between all chargeoffs, 1962-75, and the chargeoffs from classified loans during this period.

†These are all substandard classifications above the cutoff level, 1961-74, and all doubtful and loss classifications above the cutoff level, 1962-75. The charge-off data were generated by tracing the subsequent performance of each classified loan.

bank coefficients of variation were all below 27 per cent. This result is not surprising since a few of the small banks had only a handful of classifications in each of the categories over the sample period.

Some of the variation in chargeoff percentages is to be expected even if the examiners classified loans on a consistent basis, since a sizeable fraction of unclassified loans was not reviewed and since bankers differ in their efforts to collect on problem loans. Some variation is also due in part to differences in examiner judgements and possible diversity among individual loans in each category, particularly in the wider categories of substandard and unclassified loans.

Another factor that may cause variability in the chargeoff ratios is changing economic

conditions. Bank loan chargeoffs as a percentage of total loans may be higher when economic conditions are worsening than when they are improving. This hypothesis has been tested and confirmed over a larger sample size by the authors.¹²

Also, if the economy is worsening, a higher percentage of classified loans might be expected to deteriorate to chargeoffs than during a recovery period. This relationship was examined by computing the percentage, according to the number of loans, of each year's substandard classifications at the sample banks that was subsequently charged off. Since most of these chargeoffs occurred within three years after classification, the chargeoff percentages were compared to the economic conditions that prevailed just after the classifications.

These yearly chargeoff ratios exhibited a definite cyclical trend. Loans classified substandard in 1965, 1968, and 1973 had the highest chargeoff rates. For these loans, the period after classification was characteristically a recession or growth recession. Additionally, the lowest substandard chargeoff rates were recorded for those classifications near the end or shortly after each of the above recession periods. Such substandard classifications would thus be facing a rapidly improving economy. Overall, the chargeoff rate for loans classified substandard at the sample banks just prior to a recession period averaged about one and one-half times the chargeoff rate of such loans during economic expansions.¹³

**Table 4
PERCENTAGE OF CLASSIFIED
AND UNCLASSIFIED LOANS
CHARGED OFF: 1962-75**

	<u>Mean</u>	<u>Standard Deviation</u>	<u>Coeffi- cient of Variation</u>
All Banks			
S _B /S	10.19	7.75	.761
D _B /D	49.25	27.73	.563
L _B /L	89.68	17.50	.195
U _B /U	.16	.08	.500
Large Banks			
S _B /S	8.42	2.20	.261
D _B /D	64.28	17.08	.266
L _B /L	97.77	1.94	.020
U _B /U	.13	.03	.231
Small Banks			
S _B /S	11.07	9.47	.856
D _B /D	39.23	30.14	.768
L _B /L	86.65	19.95	.230
U _B /U	.17	.09	.529

¹² Hoenig and Spong, "Examiner Loan Classifications and Their Relationship to Bank Loan Chargeoffs and Economic Conditions," unpublished paper, pp. 18-20.

¹³ In numerical terms, the lowest chargeoff rate was 14.75 per cent for 1971 substandard classifications, and the highest chargeoff rate was 35.19 per cent for 1968 substandard classifications. During the three cycles or growth cycles observed in this study, the chargeoff percentages for sub-

Economic conditions and trends, then, are important factors in interpreting examination data and in forecasting future loan loss exposure. As mentioned previously, however, examiner judgement and other factors also may affect the variability of chargeoff ratios. Consequently, while examination data do provide useful information about loan portfolio risk, some variability exists in the relationship between loans classified by the examiners and future loan losses.

The actual consequences of this observed variability in the classification-loss relationship must be evaluated in the context of the bank examination process. Since the main purpose of bank examination is to protect bank depositors, forecasts of future loss exposures are important to bank supervisors only as a means of protecting depositors. Thus examiners are primarily concerned with finding an efficient means to detect bank problems before such problems threaten depositor safety. Variability in the classification-loss relationship becomes a severe problem only if it disguises the condition of problem banks. On balance, it would seem that the moderate degree of variability in the chargeoff percentages in Table 4

standard classifications occurring immediately prior to a recession ranged from 6.22 to 13.33 percentage points higher than the chargeoff rates for substandard classifications at or near the beginning of the previous recovery period.

is not sufficient to result in a bank with serious loan problems not being noticed by the examiners.¹⁴

CONCLUSION

A major portion of the loan problems for the banks studied were identified in bank examinations. Examiners were also successful in categorizing bank loans according to their relative risk of default. In addition, although loan classifications and chargeoffs showed some definite fluctuations among individual banks and among the years of the study, part of this variation could be explained by economic conditions.

Consequently, bank examinations provide useful information on loan risk, although some allowance must be made for unexplained factors in predicting future loss exposure. And, because of this classification-loss relationship, loan classification data serve as an important factor in identifying problem banks which need closer supervision.

¹⁴ The value of loan classifications in identifying banking problems has also been recently tested with a larger sample of banks. See **Sinkey**, *op. cit.* **Sinkey** did not look at individual loan classifications, but instead tested the relationship between classifications and problem banks. He found that classified loans were a major factor in identifying problem banks and that while "most 'problem' banks do not fail," "most failed banks are classified as 'problem' banks prior to their closing." (See p. 191.) Similarly, not all classified loans are charged off, especially substandard classifications, but most loan chargeoffs were previously classified by the examiners.

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